


WEST VIRGINIA
GEOLOGICAL SURVEY



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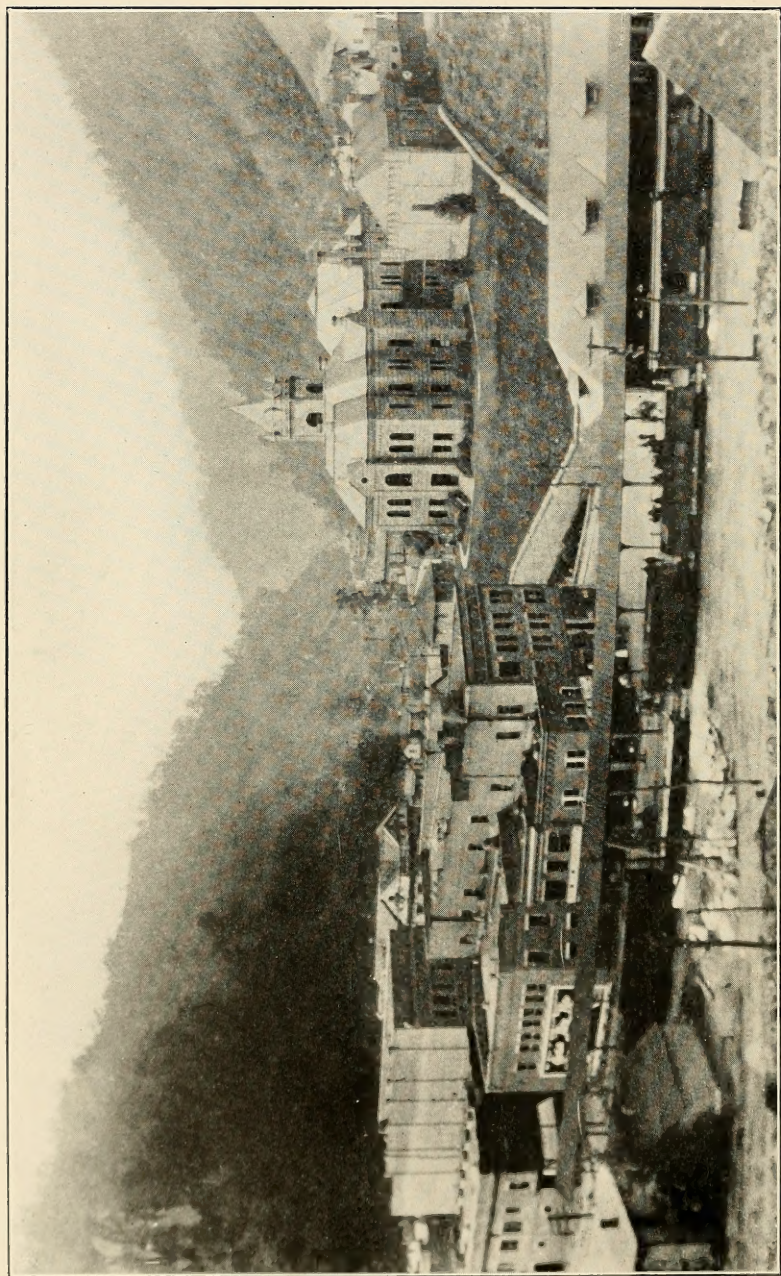
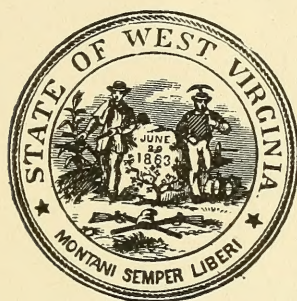


PLATE I—Frontispiece. Showing view of Welch and vicinity.

WEST VIRGINIA GEOLOGICAL SURVEY



Wyoming and McDowell Counties

By

RAY V. HENNEN, Assistant Geologist,

Aided by

ROBERT M. GAWTHROP, Field Assistant.

I. C. WHITE, State Geologist.



WHEELING NEWS LITHO. CO.
WHEELING, W. VA.
1915

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RAY V. HENNEN.....*Assistant Geologist*

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DAVID B. REGER.....*Assistant Geologist*

W. ARMSTRONG PRICE.....*Volunteer Paleontologist*

ROBERT M. GAWTHROP (to Nov. 15, 1915).*Field Assistant*

D. D. TEETS, JR.....*Field Assistant*

BERT H. HITE.....*Chief Chemist*

JAN B. KRAK.....*Assistant Chemist*

J. LEWIS WILLIAMS.....*Chief Clerk*

RIETZ C. TUCKER.....*Engineer and Stenographer*

LETTER OF TRANSMITTAL.

To His Excellency, Hon. Henry D. Hatfield, Governor of West Virginia, and President of the West Virginia Geological Survey Commission:

SIR:

I have the honor to transmit herewith the Detailed Report and the topographic and structural maps covering the Counties of Wyoming and McDowell, prepared by Ray V. Hennen, Assistant Geologist, aided by Robt. M. Gawthrop, Field Assistant. The Soil Maps and Report covering this same area will be printed in a separate pamphlet and distributed later.

I. C. WHITE, *State Geologist.*

Morgantown, W. Va., December 31, 1915.

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AUTHOR'S PREFACE.

This volume contains a short historical and industrial sketch; one chapter on the Physiography; one chapter on the Structure; five chapters on the Stratigraphy; and three chapters on the Mineral Resources of Wyoming and McDowell Counties.

The greater portion of the book is included in Chapter X on Coal—by far the most valuable mineral resource yet discovered in the area. In order to describe the several beds in their proper sequence it was found necessary to make an exhaustive study of the entire rock system, and to embody in the text a large number of sections both general and special, as also the logs of coal test borings. This matter will not interest the layman as much as it will the engineer, geologist or coal operator interested in the development of the several fields.

Two maps accompany the Report in a separate atlas; viz, Map I, showing Topography, and Map II, the General and Economic Geology. On the latter the Structure or inclination of the strata is shown by two sets of contours 50 feet apart, those in *green* showing the elevation above sea level of the base of the Sewell (Davy) Coal horizon, and those in *red*, the same for the base of the No. 3 Pocahontas Coal. In addition to these separate maps there are 28 Figures and 36 Plates embodied in the book.

Figures 5 to 28 inclusive, published in the text, are intended to show at a glance where the several coal beds are believed to attain minable thickness and purity. Since some of these seams are too thin or impure to be minable in certain regions, it has been necessary on many of the figures to establish arbitrary lines showing their disappearance in these localities, where they are known or believed not to exist in minable quantity. Hence, it must be kept in mind in referring to these figures that there are probably small areas of good coal just across the line in regions indicated as barren, and likewise numerous patches within the shaded sections where the coal is thin and worthless. Such a representation can show only the *approximate line of disappearance*, and in the regions where there is doubt, the data given in

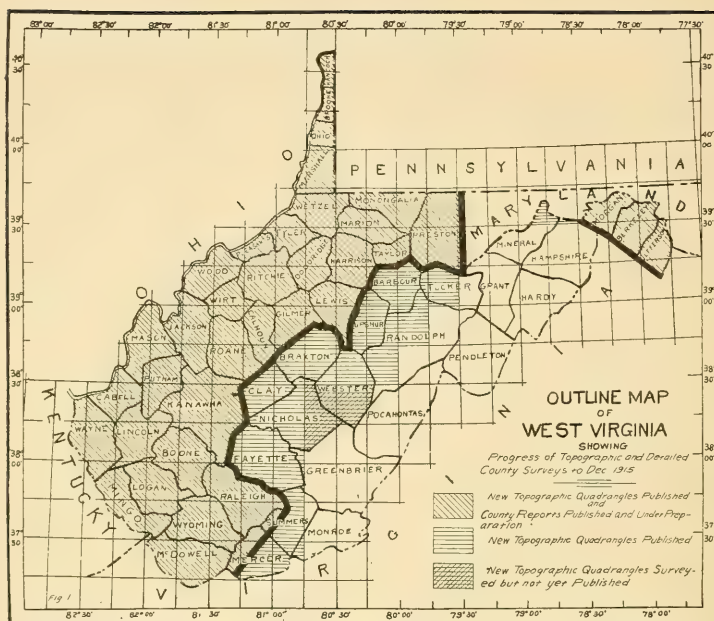


Figure 1.—See explanation on Figure.

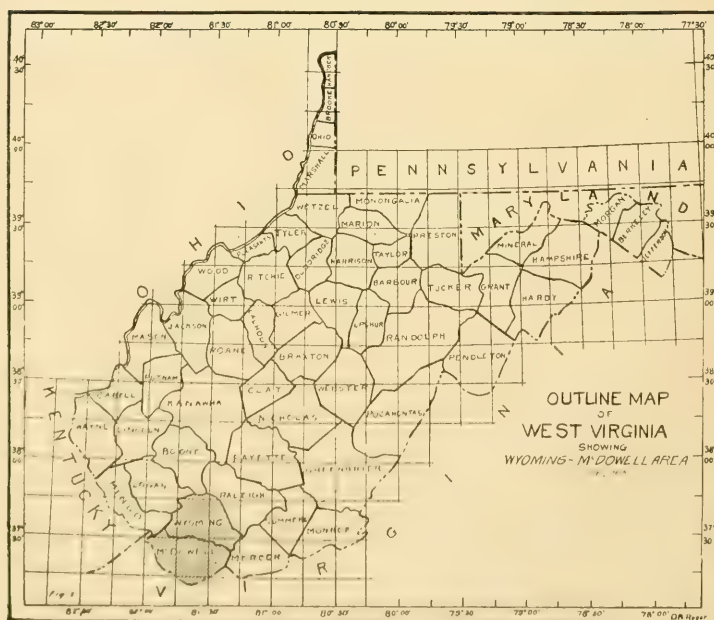


Figure 2.—See explanation on Figure.

the text, accompanying the numbered coal openings and prospects on Map II, should be consulted for the character of the bed in question.

A large number of coal openings, prospects and mines have been described in Chapter X, designated consecutively from 1 to 893, and the number placed on Map II along with the symbol for the corresponding mine. The description of any one of these openings may be readily found in the text by reference to the heading: "Mines, Coal, by Numbers," in the Index where all these numbers are arranged in consecutive order. Should information be desired on the coal resources of any special magisterial district, the reader is referred to the heading in the Index: "Minable Coals by Magisterial Districts," where all the data are assembled for convenient reference.

The author, in company with R. M. Gawthrop, Field Assistant on the Survey Staff, spent the field season of 1914 in making the necessary researches on the ground to obtain the facts included in the Report, and the winter of 1914-15 and up to the latter part of July, 1915, was mostly spent in assembling the data in its published form. Mr. Gawthrop assisted throughout the office work, doing the most of the drafting and tabular matter, as also much of the tedious routine work of compiling sections and arranging the logs of coal test borings, while at the same time assisting in similar work on another report of the State Survey, all of which duties were done in a thorough and careful manner.

The chemical analyses and calorific tests, except those which have been taken from former Reports of the State Survey, as also the U. S. Geological Survey and U. S. Bureau of Mines, were made by J. Berghius Krak, Assistant Chemist, under the supervision and with the assistance of B. H. Hite, Chief Chemist.

Mention is made here of the hearty manner in which many mining engineers, mine managers and superintendents, coal operators and other professional and business men of the area co-operated in furnishing valuable maps, logs of coal test borings and miscellaneous information, secured at private expense. In this respect, Mr. Howard N. Eavenson, Chief Engineer of the U. S. Coal & Coke Co., Gary, W. Va., rendered invaluable services. Due credit for all such material furnished is given in the text.

As in former reports, the author expresses his obligation to Dr. I. C. White, State Geologist, for his careful supervision and valuable suggestions throughout the work of preparing this Report.

RAY V. HENNEN.

Morgantown, W. Va., July 16, 1915.

NOTE.—A later study by W. A. Price of the fossil fauna from the suggested marine horizons of the New River and Pocahontas Groups; viz, the Douglas Shale, Roof Shale of No. 6 Pocahontas Coal, Roof Shale of No. 3 Pocahontas Coal, and North Fork Shale, described on pages 183, 220, 227 and 239, respectively, reveals only 3 species, all of which appear to be brackish or fresh water types; hence, the marine invasion of the Pottsville Series seems confined to the Kanawha Group, a natural subdivision of the former, which was originally based on lithology.—R. V. H., Dec. 4, 1915.

INTRODUCTION

BY I. C. WHITE.

This Volume is probably the most important of all the Detailed County Reports yet issued. It covers one of the richest coal districts of the State in a region where the so-called "Smokeless" or New River and Pocahontas Coals have attained such great importance in the commercial markets of the world. The coals of this area and its general geology have been described by Assistant Ray V. Hennen with great detail, in his always very thorough and masterly manner. It is in this region that the Pocahontas and New River Coal Groups attain their maximum development both in thickness of measures and in number and purity of the included coal beds, vying in this respect with the counties of Mercer, Raleigh, and Fayette immediately to the east.

The two counties whose resources are herein described, together with Mercer, Raleigh and Fayette adjoining, hold the great bulk of the "Smokeless" coals of the State. True, Summers, Greenbrier, Nicholas, Webster, Upshur and Randolph each contain some areas of New River Coal, but these are of limited extent, and the included coals become progressively higher in volatile matter to the northeast, thus tending to pass out of the "Smokeless" type, the volatile combustible matter increasing to 25 per cent. and more in Nicholas, Webster, Upshur and Randolph. As is well known, these New River and Pocahontas Coals, on account of their low percentages of impurities (ash and sulphur), and high fuel values, averaging 15,000 B. T. U. and often more per pound of coal, take high rank among the best bituminous or semi-bituminous coals of the world. Being low in volatile matter (14 to 20 per cent.), ash (4 to 7 per cent.), sulphur (0.5 to 0.8), and high in Fixed Carbon (75 to 80 per cent.), with moisture only 2.50 to 3.50 as received from the mines, they are in great demand not only for steamship and general fuel purposes, but they are especially valuable for mixing with higher volatile coals in the manufacture of coke in by-product ovens, being shipped for this purpose as far west as Gary, Chicago and Joliet, and

north to the great iron districts of Sharon, Pennsylvania, and Youngstown, Ohio. The growth of the coal industry in McDowell County from its beginning in 1889, only 26 years ago, up to July 1st, 1915, is strikingly shown by the following statistical table compiled from the annual reports of the West Virginia Department of Mines:

Coal Production of Wyoming and McDowell Counties.

Year.	Wyoming County.		McDowell County.	
	Long Tons.	Short Tons.	Long Tons.	Short Tons.
1888.....				
1889.....			245,760	275,251.20
1890.....			504,222	564,728.64
1891.....			704,871	789,455.52
1892.....			1,100,882	1,232,987.84
1893.....			1,876,838	2,102,058.56
1894.....			2,340,581	2,621,450.72
1895.....			2,440,551	2,733,417.12
1896.....			2,836,013	3,176,334.56
1897.....			2,617,917	2,932,067.04
1898.....			3,183,529	3,565,552.48
1899.....			3,516,668	3,938,668.16
1900.....			4,142,102	4,639,154.24
1901.....			4,219,251	4,725,561.12
1902.....			4,734,199	5,302,302.88
1903.....			5,249,913	5,879,902.56
1904.....			5,524,376	6,187,301.12
1905.....			6,810,730	7,628,017.60
1906.....			7,806,524	8,743,306.88
1907.....			8,123,699	9,098,542.88
1908.....	652	730.24	8,515,689	9,537,571.68
1909.....			9,415,069	10,544,877.28
1910.....			12,189,200	13,651,904.00
1911.....			11,945,763	13,379,254.56
1912.....			13,768,077	15,420,246.24
1913.....	1,650	1,848.00	14,913,342	16,702,943.04
1914.....	39,789	44,563.68	14,055,157	15,741,775.84
1915.....	96,166	107,705.92	13,007,674	14,568,594.88
Totals...	138,257	154,847.84	165,788,597	185,683,228.64

This table is a striking testimonial to the excellence of the Pocahontas and New River Coals, since barring years of great depression in the coal trade, like 1907, 1911, and 1914-15, these statistics exhibit a very rapid and continuous growth increasing by leaps and bounds from the date (1889) when McDowell County first got access to railway transportation, until 1905, when this county forged to first place in the column of West Virginia coal producing counties, winning the banner from Fayette County

in that year, and maintaining the same over every other county of the State by a majority of several million long tons, as may be seen by consulting the table on page 260 of this volume. The statistics of production are kept by the West Virginia Department of Mines in terms of the English or "Long" ton of 2,240 pounds, but in the table given above the equivalent production in "Short" tons of 2,000 pounds each is also shown. On account of the superior quality of the Pocahontas and New River Coals, the demand for the same will doubtless continue to increase the production from McDowell County to a maximum of 20 to 25 million short tons annually, which with the coals from other (Kanawha) fields to the north, would probably be near the limit of transportation facilities available for this county. According to the calculations of Hennen and Gawthrop, there remains in this great county approximately 5,140,000,000 short tons of available coal, about 200,000,000 short tons having been mined, left in ribs, pillars, etc., and if 80 per cent. of this (5,140,000,000) remaining amount shall be saved, there would be in round numbers 4,000,000,000 short tons yet to be mined and marketed from McDowell, of which all except a little over 500 million short tons belongs in the New River and Pocahontas Groups distributed in the proportion of 2 of the latter to 3 of the former. Hence to exhaust the coal in McDowell County (4 billion short tons) at the rate of 20 million tons annually, will require a period of 200 years, or if production should rise to a maximum of 25 million tons annually, it would require a period of 160 years.

Wyoming County, according to Hennen and Gawthrop's calculations, has practically the same amount of unmined coal (5,061,292,844 short tons) as McDowell; viz, about 4 billion short tons, after deducting 20 per cent. for waste, although only about half of it belongs in the New River and Pocahontas Groups, the other half (2 billion tons) belonging in the Kanawha Group above. Mining operations have only just begun in Wyoming County (as may be seen from the above table) owing to lack of any railway facilities up to the time that the Virginian Railway was built through a portion of its area in 1907. However, with a branch extension of this latter railway down the Guyandot now in contemplation, and the extension of the Chesapeake and Ohio Railway lines into Wyoming County, both from its Piney Branch

down Slab Fork of the Guyandot, and also up the latter stream from the Logan County coal field from which its Guyandot Branch already taps the main line at Barboursville, Cabell County, the coal fields of Wyoming County will very probably have the same rapid development that has signaled the opening up of its sister county to railway transportation. This is already foreshadowed by the large rate of increase in Wyoming coal tonnage since it really began in 1914. Hence the great coal district covered by the counties of Wyoming and McDowell, aggregating $(507.3+538.4)$ 1045.7 square miles, is certain to have an industrial life of 100 to 200 years in the production of very high grade fuels, even if these coals continue to be utilized so largely outside the area where produced.

Owing to the nature of the topography in these two counties, the valleys being mere V-shaped trenches, except only occasional narrow bottoms, there is but little ground available for factory sites after the railways and mines are sufficiently provided with track and yardage facilities, and hence the growth of large factories within the area is not possible. Even the manufacture of coke in the old wasteful way will happily cease within the district as soon as the present plants are abandoned, since practically no new bee-hive ovens have been constructed for several years, because it has been found more profitable to ship the coal designed for coke to the great iron manufacturing districts where mixed with 20 to 30 per cent. of high volatile coal, a much better quality of coke is produced in by-product ovens, and where the extra yield of fuel gas, ammonia, coal tar, and other by-products can be readily utilized in the larger centers of population. The nature of the topography also forbids much agricultural activity, since the hills slope upward from the narrow valleys at angles of 35° to 40° , interrupted occasionally by great projecting cliffs of massive sandstone, and hence except on some of the wider ridges (most of them being mere "hog-backs") very little land is available for the cultivation of cereal or any other kind of crops except under great disadvantages.

To the statesman and philosopher who look forward into future history, the problem of what is to be the ultimate fate of the Commonwealth's large areas similarly situated to those of Wyoming and McDowell when all of their present natural re-

sources of coal and lumber have been exhausted a century or two hence, is not without interest even now. Will the existing prosperous towns and villages practically disappear? Undoubtedly, yes! The history of Pithole, Pennsylvania, and many other mining towns which flourished for a brief season upon an inhospitable soil, only to vanish forever when the resources that called them into existence were exhausted, give an almost unanimous affirmative answer. What, then, of value will be left in these two great counties of our State and several others just like them as to topography and soils, when their mineral and timber resources are gone? The answer is not problematical. They will revert to forest, fish and game preserves, the only destiny for which they will have any special commercial value, aside from a limited use of small areas in each where agriculture and grazing are possible. Practically all of this area was once covered with splendid hardwood forests, the Poplar or Tulip Tree being especially abundant, and with wise legislation to encourage reforestation and protect the growing trees from fire there is no reason why these large areas of the State may not continue to be sources of considerable income and importance to the Commonwealth, after their mineral resources have been exhausted, instead of reverting to a wilderness of barren lands worth only 25 to 50 cents per acre, as these lands were before the great value of their coal and lumber resources was recognized and the railways were built to carry these products to market.

The late Maj. Jed Hotchkiss of Staunton, Virginia, a distinguished member of the staff of the great Confederate leader, General Stonewall Jackson, was the first geologist to publish to the world in his monthly journal, "*The Virginias*," any detailed information concerning the wonderful coal deposits of Wyoming, McDowell, Mercer, and Tazewell (Va.) Counties. It was also due to the work of Maj. Hotchkiss and friends that the Norfolk and Western Railway was induced to build a branch into the Pocahontas field, and begin shipments from Pocahontas, Tazewell County, Va., in 1882. The coal proved so efficient and valuable that the "Branch" was soon extended through a tunnel on the great No. 3 Pocahontas Coal bed under Flat Top Mountain into West Virginia, and finally grew into a trunk line system by extensions down the Big Sandy and Twelve Pole drainage through

McDowell, Mingo and Wayne Counties to the Ohio River and on beyond to Columbus and Cincinnati, with connections to Chicago, Toledo, Cleveland, and other great coal marts of the middle west, so that these very pure coals not only go in vast quantity to tidewater at Norfolk, Sewalls Point, Newport News, etc., but a very large tonnage is shipped both north and west for coke and general steam and domestic purposes. Subsequent to the investigations of Maj. Hotchkiss and his staff of engineers in McDowell County, his explorations were carried into Wyoming, where many coal openings were made and connected with elevations above tide under the immediate supervision of Capt. M. A. Miller, C. E., of Richmond, Va. At one of these localities on the Guyandot River, 5 miles above Pineville in Wyoming County, a deep trench was dug to bed rock from the top of a steep hill to the bottom of the same at the river level, 680 feet lower. All of the coal beds revealed in this extensive stripping were opened and carefully measured by Capt. Miller and the results mailed to the writer under date of June 10th, 1891. This important contribution to the geology of Wyoming County was overlooked until after Mr. Hennen's Report had been printed, and as the spirit-level measurements and details of the coals revealed by the stripping are of much value even if Capt. Miller's identifications of the several coal beds may be in error, they are published here just as given by their author, the suggested identifications in parentheses being by I. C. White. The Miller section is as follows:

Geological Section of Mountain Measured on North Side of Guyandot River, 5 Miles Above Pineville, Wyoming County, W. Va. Developed by a trench dug from the river to the top of the mountain, by M. A. Miller, C. E.

Top of mountain, 2055 feet A. T.

			Elevation A. T. Bottom of Thickness. Coal Beds, Feet. Feet.
Sandstone			105
No. 6 Coal (Sewell— I. C. W)	<div> <div>Top coal. 8"</div> <div>Slate ... 2</div> <div>Coal ... 2' 4</div> <div>Slate ... 1</div> <div>Coal 8</div> </div>	3' 11"	1950
Massive sandstone			140
Sandstone			40
Slate			140

	Thickness. Feet.	Elevation A. T. Bottom of Coal Beds. Feet.
No. 5 Coal (Fire Creek— I. C. W).....	$\left\{ \begin{array}{l} \text{Top coal. 1' 4''} \\ \text{Slate ... 4 0} \\ \text{Coal 2 4} \end{array} \right\} 7' 8''$	1630
Sandstone	65	
Slate	55	
No. 4 Coal (No. 9 ?—I. C. W), 2' 0".....		1510
Sandstone	140	
No. 3 Coal (probably No. 6 Pocahontas—I. C. W.), 4' 6", at water level of river.....		1370

The No. 6 coal of the above section agrees with Hennen's contour elevation for the **Sewell seam** at the locality in question, and as the interval between the Sewell bed and No. 3 Pocahontas is 710 feet in this region, as we learn from diamond drill borings, the coal near river level called "No 3" by Miller would belong about 130 feet above the true No. 3 ($580' + 130' = 710'$), and hence would most probably correlate with the true No. 6 Pocahontas.

ERRATA.

Page	Line	
89	20	For Sand rock, " Lower Gilbert ", read " Lower Guyandot ".
181	13	For 50 feet above the " Gilbert Coal ", read " Douglas Coal ".
181	14	For Gilbert "A" Coal read Douglas "A" Coal .
207	6	For (McDowell) read Wyoming .
344	2	For No. 9 Pocahontas Coal read No. 6 Pocahontas Coal .
444	25	For Allex. Collins read Alex. Collins .
645	17	For 116-77 read 116-17.
714 up	4	For 53,000,0000 read 53,000,000.

PART I.

History and Physiography.

CHAPTER I.

HISTORICAL AND INDUSTRIAL DEVELOPMENT.

LOCATION.

Wyoming and McDowell Counties, comprising the area described in this Report, are situated in the extreme southern edge of West Virginia, and are included between the parallels of $37^{\circ} 48'$ and $37^{\circ} 12'$ North Latitude, and $81^{\circ} 13'$ and $82^{\circ} 00'$ West Longitude from Greenwich. **Wyoming County** is bounded on the north by Logan, Boone and Raleigh; on the east by Raleigh and Mercer; on the south by McDowell; and on the west by Logan and Mingo Counties. **McDowell County** is bounded on the north by Mingo and Wyoming; on the east by Mercer County and the State of Virginia; on the south by the State of Virginia; and on the west by the State of Virginia and Mingo County. Their geographic position may be observed in detail from Maps I and II which accompany this Report in a separate atlas.

TRANSPORTATION.

Water Ways.

Guyandot River.—The Guyandot River, flowing in a westerly direction entirely across Wyoming County, has long been used as a means of transportation for great numbers of logs,

and it is still largely used for this purpose. Owing to the heavy shoals along its bed, four to five miles eastward from the Mingo-Wyoming County Line, where the river cuts through the great Dotson and Lower Dotson Sandstones, it is not navigable for rafts, or steam and gasoline boats. It can only be used for the transportation of logs when at flood stage, as ordinarily the volume and current are not sufficient even to carry individual logs. Its rate of fall—slightly over 12 feet to the mile—and its comparatively small drainage basin above Justice render a system of locks and dams for navigation purposes impractical from an economic standpoint.

Tug Fork of Big Sandy River.—Tug Fork is very similar in character to Guyandot and flows in a northwesterly direction entirely across McDowell. Northwestward from the territory of this Report, it is the State Boundary Line between West Virginia, and Virginia and Kentucky, and unites with Levisa Fork at Louisa to form the Big Sandy River, a tributary of the Ohio. Like the Guyandot it was once used extensively in transporting push boats, rafts and logs before the construction of the Norfolk and Western Railway which now extends along its valley. A system of locks and dams was once planned and partly constructed along its lower course in Wayne County, a description of which is given by Krebs on page 3 of the Cabell-Wayne-Lincoln Report of the State Survey. In McDowell, Tug Fork has even a greater rate of fall than the Guyandot in Wyoming County, so that a system of locks and dams for navigation purposes in this part of its course would be even more impractical.

Steam Railroads.

• **Norfolk and Western Railway.**—The Norfolk and Western was the first railway to be built into either county, and is the only line yet in McDowell, where it carries an immense coal traffic both East and West. The main line traverses the latter county in an east and west direction along the valley of Lakhorn Creek and Tug Fork. J. M. Callahan¹ gives the following interesting account of the early history of this road:

¹Semi-Centennial History of W. Va.; pp. 216-217; 1913.

"The Norfolk and Western Railroad of Virginia emerged in 1881 as a result of the foreclosure sale of the unsuccessful Atlantic, Mississippi and Ohio Railroad, which had been formed in 1870 by the consolidation of the Norfolk and Peferburg, the Southside, and the Virginia and Tennessee Railroads. Organized primarily to develop coal, iron and other resources, and especially attracted by the discovery of good coal near the site of Pocahontas, in Virginia, it began its existence by the purchase of the proposed New River Railroad—projected as a narrow-gauge to connect with the Chesapeake and Ohio at Hinton, but completed as a broad-gauge, which, ascending East River from New and passing along the valley of the Bluestone, penetrated the great Flattop coal field of Pocahontas Coal. This New River division terminating at Pocahontas, selected partly with a view to later extension to the Ohio, was constructed in 1881-82, resulting in large shipments of coal by 1883. The Flattop Mountain extension down the Bluestone and up its western branches, begun in 1884, greatly increased shipments.

"The original five-foot gauge of the western extension was changed to 4 feet 8½ inches on May 29, 1886, and the gauge of the main line was also changed on June 1, 1886.

"The Elkhorn Tunnel, following the famous coal vein through Flattop Mountain, was begun in 1886 and completed in 1886.

"The original northwesterly route to the Ohio, surveyed in 1886, via Elkhorn Creek, Clear Fork, Coal Creek and Mud River, was regarded unsatisfactory and abandoned in 1888. The route adopted for the Ohio extension followed down Elkhorn to Tug, thence to Pigeon, thence up Pigeon and Laurel Fork and across the divide to Twelvepole, which was followed to its mouth at Ceredo. The difficult construction of this extension was begun in 1890, and the road was opened on November 12, 1892 by the completion of the Hatfield Tunnel, eight miles east of Williamson. The Ohio River bridge was completed in 1891. Meantime, in 1890, the purchase of the Scioto Valley Railroad and the Shenandoah Valley Railroad furnished additional terminal facilities."

The branch lines of the Norfolk and Western in McDowell County were extended as follows: North Fork Branch in 1894; Tug Fork Branch to Gary in 1904, with still further extensions later to Jenkinjones; Clear Fork Branch, 1905; Dry Fork Branch, 1906, later extended to a connection with the Clinch Valley Branch in Virginia; and Spice Creek Branch, 1909.

According to Judge Jas. French Strother, this road was connected, building both east and west, at Roderfield in 1892.

The rapid development of the region traversed by the Norfolk and Western Railway is indicated by the following table showing the growth of passenger traffic at certain West Virginia stations along the line as shown by Callahan on page 220 of the Semi-Centennial History of West Virginia:

	Passengers forwarded		Passengers received	
	1893	1912	1893	1912
Bluefield	51,167	163,461	48,035	153,591
Bluestone	6,070	61,385	5,531	61,649
Cooper	24,507	14,127	20,421	17,954
Bramwell	23,419	30,566	20,904	27,878
Simmons	18,061	17,275	22,815	19,813
*Mora .....	.....	12,204	.....	13,641
*Matoaka .....	.....	21,442	.....	21,341
Maybeury	20,063	26,847	24,438	29,533
Elkhorn	18,941	38,369	22,017	37,894
North Fork	9,196	128,449	8,024	124,805
Keystone	20,625	79,029	17,921	69,562
Eckman	7,210	15,342	6,366	20,007
Vivian	9,931	64,590	12,255	67,417
Welch	14,489	132,590	14,598	133,525
*Wilcoe .....	.....	16,904	.....	17,977
*Gary .....	.....	31,993	.....	45,152
Davy	2,822	23,870	2,847	25,679
Iaeger	2,747	36,427	2,719	32,949
*Berwind .....	.....	12,636	.....	10,290
Devon	1,347	10,257	1,653	10,639
Thacker	2,224	16,436	2,094	18,101
Matewan	3,857	24,864	4,269	25,677
Williamson	7,446	88,044	6,921	87,401
*Chattaroy .....	.....	18,786	.....	20,737
Naugatuck	2,274	14,311	2,229	16,693
*Fort Gay .....	.....	16,863	.....	16,693
Wayne	7,790	12,507	7,294	10,719
Kenova—Local	14,312	61,309	14,860	54,441
Kenova—Connection	1,948	6,339	2,550	8,429

*Not in existence in 1893.

Virginian Railway.—The Virginian Railway, traversing the eastern point of Wyoming in a north and south direction, is the only railroad in that county. It is located along the valleys of Slab Fork, Guyandot River and Barkers Creek. The road was begun in 1894 by the construction of a five-mile stretch south from Deepwater on the Kanawha River up Loup Creek to serve certain lumber interests in that locality. In 1902 the extension of this line with a straighter alignment and lighter grades was begun. In 1907 the Deepwater Railway of West Virginia and the Tidewater Railway of Virginia, both owned by H. H. Rogers of New York City, were consolidated and incorporated as the Virginian Railway. Mullens was its terminus in March, 1907, and on July 1, 1909, it was in operation throughout its entire course from Deepwater to tidewater at Sewalls Point and Norfolk. No expense was

spared by Rogers to secure the best possible alignment and grade through this mountainous region of West Virginia to the great coal deposits of Fayette, Raleigh, Wyoming and Mercer Counties, and its final location was decided upon only after several thousand miles of field surveys had been made. At Mullens it connects with its important Winding Gulf Branch. In addition to a very heavy coal traffic it receives large shipments of lumber from operations at Maben and Herndon.

Highways.

Wyoming County.—In Wyoming County the public highways consist of unimproved dirt roads and bridle paths or trails, no macadamized turnpikes having ever been built within its boundaries. The existing wagon roads are generally narrow, rough and poorly graded, with a few bridges across the large streams, thus making it difficult and often dangerous to travel over them in vehicles. This is especially true during the winter season and for this reason the public schools in some districts begin several weeks earlier in the year than in the more improved counties of the State. Many large areas do not possess wagon roads, the only means of communication being generally steep bridle paths or foot trails. The prevailing sandy soil of the Pottsville Measures tends to prevent muddy roads where any attempt whatever has been made to drain them, and this feature in connection with an abundance of sandstone material always near at hand renders it possible to construct good roads, adapted to light traffic, very cheaply.

The road mileage is reported by A. D. Williams, State Road Engineer, by magisterial districts as follows:

District.	Miles.
Oceana	55
Clear Fork	40
Baileysville	40
Huff Creek	40
Slab Fork	50
Center	50
Barkers Ridge	40
Total for Wyoming County	315

McDowell County.—Over a large portion of McDowell County practically the same conditions as regards public highways prevail as in Wyoming, in that these consist largely of unimproved dirt roads, bridle paths and foot trails. In the thickly settled coal mining regions, a great awakening on the importance of good roads has taken place within the last five years, during which time both paid and prison labor have been employed under the immediate charge of W. J. McClaren, County Road Engineer. The prisoners of the county and the incorporated towns, whose terms of service range from 10 days to one year, have been employed very effectively on the roads. The result has been not only an economic saving for the county but has also helped to improve the moral fiber of the prisoner as well. In the 5 years, 36.25 miles of road have been graded, and 8 miles macadamized with native sandstone, limestone from outside the county having been used only recently for repairs. According to Mr. McClaren, it has cost an average of \$2900.00 a mile to grade these roads with prisoners, whose wages of course did not enter into the estimates, only supplies, such as dynamite, tools, and feed for horses, being counted, since the prisoners are not paid a daily wage. The expense of feeding the prisoners is also not reckoned as this item would have to be paid by the county if the prisoners were idle in jail. The materials used and their durability will be discussed under "Road Material" on subsequent pages in Chapter XI.

The road mileage of McDowell is reported by Mr. A. D. Williams, State Road Engineer, by magisterial districts as follows:

District.	Miles.
Sandy River.....	55
Browns Creek.....	65
Big Creek.....	60
Adkin	40
North Fork.....	8
Elkhorn	9
<hr/>	
Total for McDowell County.....	237

The above does not include trails, coal company roads and the streets of incorporated towns.

GENERAL DESCRIPTION.

Wyoming County.

Miscellaneous Items.

Formation.—The following account is given by Lewis² of the formation of Wyoming County:

"Wyoming County was formed from Logan by Act of the Assembly, January 26, 1850. The origin of the name is involved in obscurity. By some authorities, it is said to be a corruption of the Indian **Maughwanwama**, signifying a plain, while others assert that it is a creation of the poet, Thomas Campbell, author of 'Gertrude of Wyoming.'

"The Act providing for the formation of the county required the first court to be held at the residence of John Cook, and the seat of justice to be fixed on the lands of William Cook, Sr., on the Clear Fork of Guyandotte River."

According to E. M. Senter, Clerk of the Circuit Court of Wyoming County from 1891 to 1914, the first settlement within its borders was made by William, A. J., Stephen, and Joseph McDonald, in 1784, who took out several patents on the wide bottom lands lying along Clear Fork of Guyandot between Oceana and Elklick.

Area.—The original area of Wyoming was considerably reduced by cutting off what is now the principal portion of Slab Fork District in the formation of Raleigh County. Its present area, as determined with planimeter by Gawthrop from the topographic sheets of the U. S. Geological Survey, is as follows, by magisterial districts:

District.	Square Miles.
Oceana	100.13
Clear Fork.....	52.98
Baileysville	44.20
Huff Creek.....	41.38
Slab Fork.....	85.72
Center	84.59
Barkers Ridge.....	98.30
Total for Wyoming County.....	507.30

²V. A. Lewis, History of W. Va.; p. 713; 1889.

Relief.—The surface of Wyoming ranges from 900 feet above sea level, at the intersection of Guyandot River with the Wyoming-Mingo County Line, to 3536 feet above the same datum, on the summit of Flattop Mountain at the extreme eastern point of the county, making a difference between the two extremes of 2636 feet. In the northern portion, its topography is immediately affected by Buffalo, Huff, and Guyandot Mountains; and in the southeastern part, by Flattop Mountain.

Population.—The following table gives the population of Wyoming County by magisterial districts, as shown by the U. S. Census returns for 1910, for the last three enumerations:

Population of Wyoming County.

Districts	1910	1900	1890
Oceana (including Oceana town).....	1,764	1,652	1,343
Clear Fork.....	1,227	1,158	762
Baileysville	1,119	945	628
Huff Creek.....	807	744	483
Slab Fork.....	1,655	891	760
Center (including Pineville town).....	2,122	1,794	1,404
Barkers Ridge.....	1,698	1,196	867
Totals for Wyoming County.....	10,392	8,380	6,247

The above figures show that the growth in population is fairly normal, the percentage of increase from 1890 to 1900 being 34.1 per cent., and from 1900 to 1910, 24 per cent. Slab Fork and Barkers Ridge Districts show the greatest growth for the decade ending with 1910. These are traversed by the Virginian Railway which was only completed to the seaboard in 1909. For comparative purposes, it might be mentioned here that the percentage of increase in the State for the 10 years ending with 1910 was 27.4 per cent., and for the entire United States, 21 per cent. The density of population for Wyoming in 1910 was 24.8 persons to the square mile, that for the State in the same year being 49.9, and for the continental United States, 30.4. The entire population should be classed as rural since there is no town within its borders that attains 2500 or more inhabitants.

Products.—The principal animal products of Wyoming

County are horses, mules, cattle, sheep, hogs, poultry and dairy products.

The principal vegetable products are lumber, corn, oats, rye, hay, potatoes, garden vegetables, apples, and peaches. In addition to the foregoing, the natives in part support their families from the sale of the roots of the following plants growing wild in the woods: ginseng, golden seal, black snake root, wild ginger, blood root, spikenard and may-apple.

The principal mineral product at present is coal. No test wells for either oil or gas have been drilled within the county. Lumber is the most important manufactured product. Sandstone of fair quality for building purposes occurs in abundance, as also shale for the manufacture of building and paving brick.

A considerable amount of hydro-electric power could be developed on some of the larger streams. Truck farming could be carried on with profit in the region near the Virginian Railway and along the southern edge of the county near the developed coal fields of McDowell, as these points offer a fine market for garden vegetables.

Property Valuation.—The State Auditor gives the following property valuations for Wyoming County for the years 1913 and 1914:

	1913	1914
Real Estate.....	\$ 9,076,021	\$8,929,204
Personal Property.....	1,069,800	930,336
Totals	<u>\$10,145,821</u>	<u>\$9,859,540</u>

The above figures rank Wyoming 34th among the 55 counties of the State in order of wealth.

Towns and Industries.

Pineville.—Pineville, the County Seat of Wyoming, was settled by Benjamin Short about 1853, according to E. M. Senter, Clerk of the Circuit Court of the County. It is situated on the north bank of Guyandot River at the mouth of Rockcastle Creek. It was incorporated as the town of Pineville, June 29, 1907, and has been the County Seat since January of the same year. The U. S. Census Report for 1910 gives it a

population of 334. Its nearest railroad station is about 15 miles away at Mullens on the Virginian Railway, a connection with which is made daily by hacks. At present it is only a country village with no manufacturing industries. It is surrounded by large coal deposits whose development is retarded by a lack of transportation facilities.

Oceana.—Oceana, located in the northwestern portion of Wyoming, was the County Seat from the formation of the latter in 1850 until January, 1907, when the seat of government was removed to its present location at Pineville after a long and bitter fight. A disastrous fire in which the Court House was burned at Oceana aided this removal. Oceana was first settled by William Cook and Reuben Roach about the year 1791, according to E. M. Senter, and at one time had a population of over 300. The U. S. Census Report gives it as only 129 in 1910, and 187 in 1900. In January, 1915, the postmaster reports 139 from actual count.

Mullens.—Mullens, the third and last incorporated town in Wyoming, is situated in the eastern edge of the County on the Virginian Railway, at the mouth of Slab Fork of Guyandot River. It is much the largest town in the county, its population, as given by the postmaster in January, 1915, from actual count, being 1000 persons. It was first settled by A. J. Mullens in the early 90's of the last century, according to E. M. Senter. Being an important railroad center for the county, it has had a rapid growth since the completion of the Virginian Railway. It was incorporated as the Town of Mullens in 1913. It is the junction point on the Virginian for the railroad leading up Guyandot and Winding Gulf to the developed commercial coal mines on the latter stream in Raleigh County. Mullens itself is destined to become quite a mining center, as it is surrounded by a great coal field just now being opened on a commercial scale.

Villages.—Two other villages—unincorporated—that might be mentioned are Baileysville and Maben. The former is located in the west central portion of the county on the north bank of Guyandot River, one-third mile below the mouth of Indian Creek. According to the postmaster, it had a population of 110 persons by actual count in January, 1915. Maben

is located in the eastern edge of Wyoming on the Virginian Railway, at the mouth of Marsh Fork of Slab Fork. The postmaster at that place gives it a population of 300 in January, 1915. Its inhabitants are largely mill men and their families employed at the large lumber manufacturing plant located there.

McDowell County.

Miscellaneous Items.

Formation.—McDowell County was formed from Tazewell County, Virginia, concerning which Lewis³ gives the following interesting account:

"McDowell County was formed from Tazewell in compliance with an Act of Assembly passed February 28, 1858, and named in honor of James McDowell. He was born at Cherry Grove, Rockbridge County, Virginia, October 11, 1795, and was educated at Yale and Princeton, after which he read law in the office of the eminent Chapman Johnson at Staunton, Virginia. He represented Rockbridge County in the General Assembly in 1831, and frequently thereafter until 1841, when he was elected Governor of Virginia; but before his term expired he was elected to a seat in Congress, in which capacity he served his native State until his death, which occurred August 24, 1851.

"The Act creating the county declared that the seat of justice should be called Peeryville, and Henry D. Smith of Russell County; Charles C. Calfee, of Mercer; and John C. Graham, of Wythe, were appointed to locate the same. The following commissioners were appointed to divide the county into magisterial districts: G. W. Payne, Guy T. Harrison, Samuel Lambert, Thomas A. Perry, Elias V. Harman, and Henry T. Peery."

According to Judge Jas. French Strother of Welch, McDowell was first settled by a hunting class of people largely from Virginia, North Carolina, and Kentucky, one of the earliest grants being for 40 acres at Peeryville—now English—in 1823. A part of its present area was included in Logan County from 1824 to 1834, when it was restored to Tazewell. The first Court was held at the residence of Geo. W. Payne, one mile below English (Peeryville) in August, 1858, by Judge Samuel V. Fulkerson, and later, at the residence of Mrs. Rebecca Brewster, just below the present site of Berwind.

³V. A. Lewis, History of W. Va.; pp. 728-29; 1889.

The County Seat was established at Peeryville soon after the formation of the county and was moved in 1866 to opposite the mouth of Mill Creek, near the present site of Wilcoe. The Legislature of 1867 passed an Act establishing the County Seat at the mouth of Snakeroot, at or near the present site of Coalwood, on Clear Fork of Tug. The removal of the Court House became involved in litigation and it remained on Tug Fork until 1874 when it was returned to Peeryville until 1892, when it was established at Welch where it has since remained.

McDowell County, with the exception of a few acres in the extreme eastern point, lies entirely within the drainage basin of Tug Fork, so that the high dividing ridge between the waters of the latter and Guyandot River forms a natural boundary line between Wyoming and McDowell.

Area.—The area of McDowell County, as determined by Gawthrop with planimeter from the accurate topographic sheets of the U. S. Geological Survey, is as follows by magisterial districts:

Districts.	Square Miles.
Sandy River.....	166.02
Browns Creek.....	95.43
Big Creek.....	153.27
Adkin	86.02
North Fork.....	22.25
Elkhorn	15.41
Total for McDowell County.....	538.40

Relief.—The surface of McDowell County varies from 875 feet above sea level, at the intersection of Tug Fork with the McDowell-Mingo County Line, to 3400 feet above the same datum on the summit of Flattop Mountain at the common corner of McDowell, Wyoming and Mercer Counties—the extreme eastern point of McDowell—a range in elevation of 2525 feet, slightly over 100 feet less than that for Wyoming County, as shown on a preceding page. No prominent mountain range traverses the county, the differences of elevation being due to a gradual rise both of the valley floors and hill summits from the west margin to the southeastward. The reader is referred to Map I accompanying this Report in a separate atlas for an

accurate topographic map of both counties, with a 50-foot contour interval.

Population.—The population of McDowell County is given by magisterial districts in the following table, as taken from the U. S. Census returns for 1910 for the last three enumerations:

Population of McDowell County.

Districts	1910	1900	1890
Sandy River.....	3,944	3,240	1,834
Browns Creek (including Keystone City, Kimball and Welch towns).....	17,018	5,751	.....
Big Creek.....	4,791	1,393	1,271
Adkin ⁴	9,221	.....	.....
North Fork (including Burkes Garden, Clark and North Fork towns).....	5,642	2,896	.....
Elkhorn ⁴	7,240	5,467	4,195
Totals for McDowell County.....	42,794	32,430	20,721

The above figures show that the population of McDowell has grown abnormally during the two decades ending with 1900 and 1910, the percentage of increase being 56.5 and 31.9, respectively. The density of population in the latter year was 79.5 persons to the square mile—three times that of Wyoming County for the same year. As shown in the statistics for Wyoming on a preceding page of this Chapter, the increase is much greater than that of the State or Nation for the same periods. This is directly due to the rapid development of its great coal fields and the lumber industry since the completion in 1892 of the Norfolk and Western Railway; and later, the numerous branches of the latter within the borders of the county.

Products.—The principal animal and vegetable products of McDowell are practically the same as those for Wyoming County given on a preceding page of this Chapter.

The principal mineral products are coal and coke. As in Wyoming, no test well for either oil or gas has been drilled within its borders. Small flows of gas have been encountered in shallow sandstone members of the Pottsville Measures in some coal test borings. Lumber and coke are the most im-

⁴Adkin District organized from part of Elkhorn District in 1894.

portant manufactured products. Sandstone of fair quality for building purposes occurs in abundance, and likewise an inexhaustible quantity of fine shale adapted to the manufacture of brick for use both in buildings and in street paving. These will be further discussed on subsequent pages in Chapter XI. Hydro-electric power could be developed to a limited extent along Tug Fork and its larger tributaries. This feature is also further described in the last mentioned Chapter.

Property Valuations.—The following property valuations are given by the State Auditor in McDowell County for the two years ending with 1914:

	1913	1914
Real Estate.....	\$28,098,012	\$27,467,784
Personal Property.....	6,208,412	6,586,230
Totals for County.....	\$34,306,424	\$34,054,014

According to the above figures, McDowell ranks eighth among the 55 counties of the State in order of wealth.

Towns and Industries.

Welch.—Welch, the present County Seat, is located 4 to 5 miles northeast of the center of the county on Tug Fork at the mouth of Elkhorn Creek, and according to Judge Strother, was named for Capt. Isaiah A. Welch, a well known geologist, who examined the coal measures of the Elkhorn Valley at the solicitation of Maj. Jed Hotchkiss as early as 1873. At the date of completion of the Norfolk & Western Railway in 1892, the town had only 4 or 5 houses. On June 11, 1894, it was incorporated as the Town of Welch, covering an area of 303 acres, and it is now the most important railway center in the county. As mentioned on a preceding page of this Chapter, the County Seat was removed here from Peeryville (English) in 1892, where it has since remained. The town has had a remarkable growth as shown by the U. S. Census returns for the last two enumerations, giving it a population of 442 in 1900, and 1,526 in 1910, an increase of 245.2 per cent. for the decade ending with the latter year.

The **Miners' Hospital Number One** is located on the north-

west edge of Welch at the mouth of Browns Creek, and is maintained by the State largely for the benefit of the coal miners in the southern tier of counties. The following interesting account of its history and equipment is taken from page 143 of Part I, Volume II, of the Second Biennial Report of the West Virginia State Board of Control:

"The Act creating this, as well as the other two Miners' Hospitals, was passed by the Legislature in 1899. The Act provided that one should be located in the Flat Top coal region, in either McDowell or Mercer County, to be known as Miners' Hospital No. 1.

"In accordance with this Act the Board of Directors selected Welch, McDowell County, as the location, and the hospital was opened for patients in January, 1902.

"Grounds.

"The grounds consist of three and one-quarter acres of ground in the western portion of the town of Welch, donated to the State by the citizens of Welch in 1899.

"In the main this ground is practically level and well located. The front lawn, however, from a few feet in front of the main building is low and overflows annually during the high water season. This can be prevented by a concrete wall of about three feet on the front and a small portion of the eastern side with the necessary earth filling to bring the front lawn upon a level with the ground.

"Buildings.

"The buildings at this institution are of common brick and of rather cheap construction. The walls of the main hospital building are thirteen inches in thickness, while the walls of the wings, or wards, are only nine inches in thickness. During the last two years we have added the following:

"**Wards.**—We have built two wards, each of which will accommodate 10 patients, and if the increase in the work at this institution for the next two years is in keeping with that of the past, two additional wards will be required.

"**Power House.**—We have removed the plank shed used as a power house, and have constructed in lieu thereof a good one-story brick power house. In this we have reset the old boiler, engine and dynamo and have added a new boiler. Another engine and dynamo are now badly needed. Both the engine and dynamo now in use have had long, hard service, and if they should break down the institution would be left in darkness.

"**Laundry.**—We found the institution paying at the rate of \$250 per month for laundry. To avoid this we have erected and equipped a first-class laundry, in which all flat and other laundry work can be done. It has just been installed and we believe, with proper management, it will be a great saving to the State."

Only patients requiring surgical treatment are admitted to this hospital as no provisions have been made nor are the

accommodations sufficient to care for medical cases. On pages 146 to 155, inclusive, of the last Report quoted may be found the Professional Report of the Superintendent, which gives not only the requirements for admission and a general review of the work done, but also an interesting series of tables classifying the patients received in 1910-1912 according to Movement of Population, Civic Condition, Nationality, Number by Counties, Occupation of Those Admitted, and Nature of Operations Performed.

A brief description will now be given of the other incorporated towns of McDowell County; viz, Keystone, Kimball, North Fork and Burkes Garden (Crumpler P. O.), as also Iaeger, which was once incorporated and later the corporation was dissolved:

Keystone.—Keystone, the largest town in McDowell County, is situated on Elkhorn Creek, $\frac{3}{4}$ mile west of the mouth of North Fork, on the main line of the Norfolk & Western Railway. It was incorporated as the Town of Keystone in 1896, covering an area of 208.86 acres. The papers accompanying its application for incorporation give its population on August 10, 1896, as 664 persons. U. S. Census returns for 1910 give its population in 1900 as 1,088, and 2,047 in 1910. This shows a gain of 88.1 per cent. in the decade ending with the latter year. The town owes this remarkable growth to the coal mining industry in the immediately surrounding region. It was incorporated as a city in 1909.

Kimball.—The town of Kimball is also located on Elkhorn Creek, just above the mouth of Laurel Branch, $8\frac{1}{2}$ miles east by rail of Welch. It was incorporated as the Town of Kimball in December, 1906, covering an area of 166.864 acres. The papers accompanying the application for incorporation give it a population of 907 persons on October 16, 1906. The U. S. Census reports the same as 1,630 in 1910. This shows a gain for the 4 years ending with the latter year of 79.7 per cent. As with Keystone and nearly all McDowell County towns, this rapid growth is due to the rapidly expanding coal mining industry in this region.

North Fork.—North Fork is located at the mouth of a fork or stream of the same name on Elkhorn Creek, on the

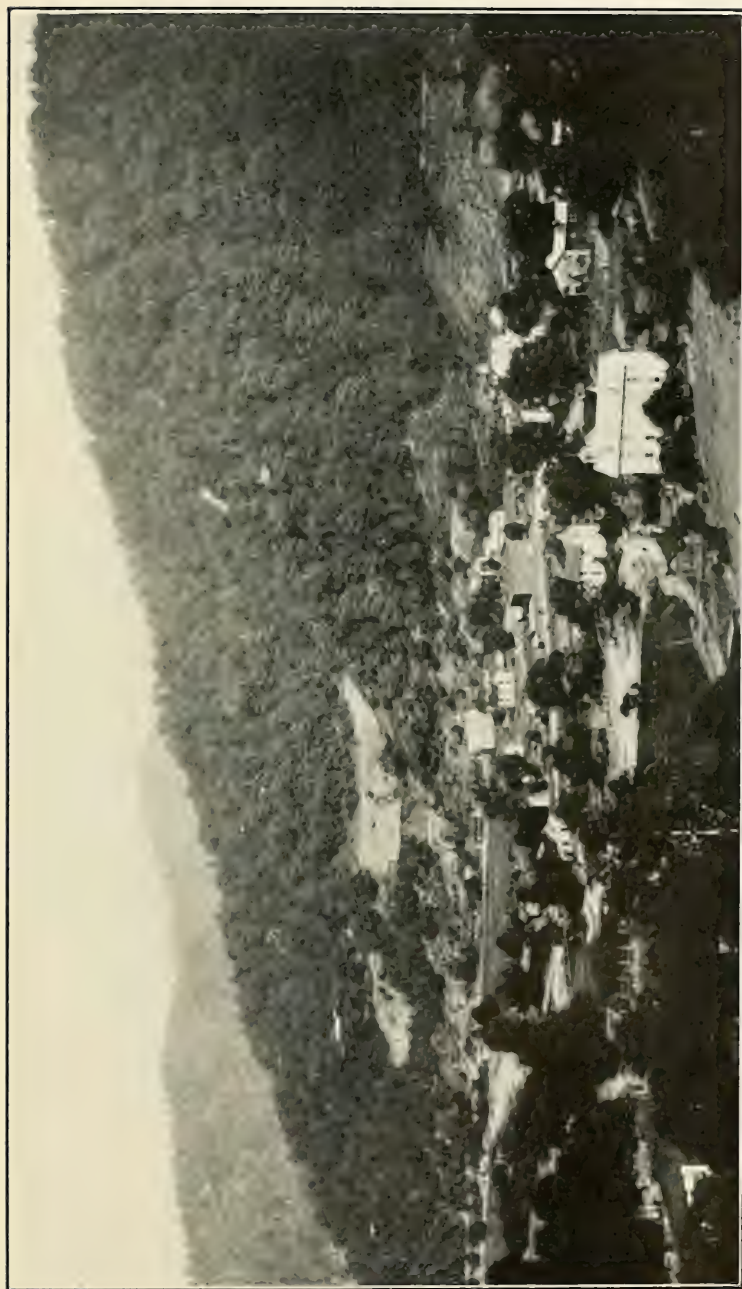


PLATE II—View of Oceana and topography of the Kanawha Group, looking northwest.

main line of the Norfolk & Western Railway, and is a junction point on the latter for a branch railroad up the first mentioned stream. It was incorporated as the Town of North Fork in 1901, covering an area of 164.5 acres. Its population, as given in the papers accompanying the application for incorporation, was 126 persons on August 7, 1901. The U. S. Census returns give it 425, in 1910. This shows a gain of 237.4 per cent. for the nine years ending with the latter year, a growth in harmony with that for other coal towns of the county.

Burkes Garden (Crumpler P. O.)—Burkes Garden, or Crumpler P.O., is located on the head of North Fork of Elkhorn Creek, at the terminus of the branch railway up the former stream. It was incorporated as the Town of Burkes Garden in December, 1902, covering an area of $217\frac{3}{4}$ acres. Its population at that time as given in the papers of incorporation was 238 persons. The U. S. Census returns for 1910 give it 500, a gain of 110 per cent. in the eight years ending with 1910. It is a coal mining town, hence the rapid growth in recent years.

Iaeger.—Iaeger is located on the north bank of Tug Fork, at the mouth of Dry Fork, in the western portion of McDowell County and along the main line of the Norfolk & Western Railway. It is an important junction point for the branch line of the N. & W. Ry. to the rapidly developing coal fields on Dry Fork. It was incorporated as the Town of Iaeger in September, 1903, but dissolved by vote of the citizens in 1908. Its population, as given in the papers accompanying the application for incorporation on July 14, 1900, was 257 persons. An actual count, as reported by the postmaster in January, 1915, gives it 374. This is a gain of $45\frac{1}{2}$ per cent. in the last 15 years. There are no commercial coal mines immediately adjacent to the town, hence the slower rate of growth.

Anawalt.—The coal mining town of Anawalt is located in the southeastern edge of McDowell County, near the head of Tug Fork, at the mouth of Little Creek and along a branch line of the Norfolk & Western Railway. It was incorporated as the Town of Anawalt on January 9, 1912. Within the last decade it has grown from nothing to a population of 500, as estimated by the postmaster in January, 1915.

Villages.—There are a number of larger and more important towns in McDowell than some of those briefly described above, but space is not given in County Reports for historical accounts of unincorporated villages.

The following table shows a list of the latter, with their respective populations, the coal mining towns being listed in black face type. Small settlements, containing only a few persons, are not given:

Population of Unincorporated Villages in McDowell County.

Names	Population	Names	Population
Algoma	700 (E)	Hemphill	300 (E)
Ashland	1,500 (E)	Hensley (Claren Station)	300 (E)
Avondale	275 (E)	Jenkinjones	1,500 (E)
Bradshaw	152 (R)	Landgraff	750 (E)
Big Four	235 (E)	Leckie	203 (C)
Canebrake	100 (E)	Marytown	440 (E)
Capels	250 (E)	Maybeury	1,875 (R)
Coalwood	1,200 (E)	McDowell	1,100 (E)
Davy	1,689 (C)	Olmsted	300 (E)
Dearing (Black Wolf)....	400 (E)	Pageton	800 (E)
Deegans	258 (C)	Pando	60 (R)
Eckman	1,000 (E)	Panther	475 (E)
Elbert	73 (R)	Premier	400 (E)
Elkhorn, including Up- land	3,000 (E)	Powhatan	700 (E)
English, formerly Peery- ville	100 (R)	Roderfield, including 3 coal camps near.....	890 (C)
Ennis	320 (E)	Switchback	2,500 (E)
Excelsior	410 (C)	Thorpe	260 (E)
Filbert	600 (E)	Twin Branch.....	1,600 (E)
Gary	650 (E)	Vivian	650 (R)
Gilliam	300 (E)	War	600 (E)
Hartwell	440 (E)	Wilcoe	225 (R)
Havaco	305 (C)	Wilmore	82 (C)
		Worth	1,000 (E)
		Yukon (Susanna Station)	225 (E)

(C)—Actual count by postmaster or other reliable person in January, 1915.

(E)—Estimate by postmaster or other reliable person in January, 1915.

(R)—Rand-McNally Shippers' Guide, population for 1915.

CHAPTER II.

PHYSIOGRAPHY

PHYSIOGRAPHIC CHANGES.

The Wyoming-McDowell Area is situated only a short distance northwest of the axial line of the great Appalachian Mountain System so that its topographic features are the result of the same physiographic changes that have molded the entire western region of West Virginia. A detailed account of the general principles of physiography have been explained in former County Reports of the Survey,¹ to which reference is made.

The great mountain system referred to above has been shown by geologic investigation to have been upheaved at the close of Carboniferous time. The minor structural folds in the two counties in question, the chief of which is the Dry Fork Anticline, are no doubt the results of the same folding that formed the mountain chain, this anticline as also other structural features being described on subsequent pages in Chapter III. Drainage systems naturally developed along the north-western slope of these mountains during the progress of the latter's formation under tangential pressure, flowing of course in the direction of the pitch of the slope into the great inland Appalachian Sea. A glance at Map II accompanying this Report in a separate atlas shows no special interruption in the direction of this drainage system within the territory of this Report by any of the minor structural folds, except the Bradshaw flexures. In Wyoming the Guyandot River cuts directly across the Mullens and Pineville Anticlines without swerving

¹G. P. Grimsley, Ohio-Brooke-Hancock Report, pp. 18-21; 1906; and Ray V. Hennen, Marshall-Wetzel-Tyler Report, pp. 32-37; 1909.

from its general course. The same is true in McDowell County with Tug Fork, South Fork, Long Branch, Big Creek, Cucumber Creek, Jacob Fork and Dry Fork, which cut directly across the much greater Dry Fork Anticline. It is thus quite evident that the development of these folds and the resultant synclines must have been so slow and gradual that these streams were able to cut down their channels as fast as the strata rose upward or depressed downward.

In southern West Virginia and especially in these two counties the conditions were favorable for the formation or the preservation of sharp distinctions between topographic features; hence, it is quite difficult to interpret the same in terms of erosion cycles as customary in describing physiographic changes. First, this northwest slope of the surface is quite gentle when compared to the dip of the strata in the same direction, which cause the older rocks of the southeast margins of Wyoming and McDowell to pitch rapidly below drainage to the northwestward and to be successively replaced in this direction by younger rocks at the surface. And, second, the mountains, plateaus and valleys are affected slightly in their forms by differences in character of the several formations cropping to the surface, but broadly speaking, the rocks are fairly homogeneous, and are not so unequally resistant to erosive action as might be expected by one familiar with the topography of the Pottsville Measures in northern West Virginia. As an evidence of this fact is the absence of very steep rapids and waterfalls along the streams in the territory of this Report. Hence, it follows that in such a region wide terraces or escarpments are not well produced, or if so, their forms are not well preserved, and that distinct topographic features developed under different cycles of erosion are not finely differentiated.

However, in spite of the meager evidence preserved, everything points to the conclusion that the general surface of the region, shortly after its upheaval at the close of the Carboniferous, passed through a long period of sub-aerial erosion during Cretaceous time, as approximately determined from investigations of America's best geologists, in which it was base-leveled into a peneplain almost flush with the sea. This was

followed by an uplift along the axis of the Appalachian System on the southeast of the two counties in question, which raised the surface and tilted it at a considerable angle to the northwest. Erosion thus became quite active again on this elevated plateau during a period of quiescence of subterranean forces which followed, and a second peneplain was developed in the Tertiary period, especially in the regions adjacent to the larger streams. This was again interrupted by another uplift during and after which the streams again cut out well-defined channels into their old, broad and partially base-leveled valley floors. Since the beginning of the last mentioned upheaval there has apparently been no prolonged interruption of erosive action that could be definitely attributed to subterranean force. In fact this slow upward movement may still be proceeding. If it has ceased, sufficient time has not elapsed to allow the streams noticeably to widen their valleys, the latter, with one or two exceptions, being narrow and V-shaped.

Along the northwestern border of Wyoming and McDowell, remnants of the ancient Cretaceous peneplain above mentioned are now visible in the high ridge and mountain summits, ranging in elevation from 2200 to 2400 feet above sea level. Along the southeastern margin of both counties, it is apparently represented by the highest summits of Flattop Mountain, noticeably in the extreme eastern point of Wyoming at an elevation of slightly over 3500 feet above sea level, and in the extreme eastern point of McDowell in the wide and comparatively level summit of the same ridge, its elevation here being slightly less than 3400 feet above the sea.

As mentioned above, traces of the Tertiary peneplain may be observed in the flattened ridge and spur summits adjacent to the larger streams. These apparently have the same elevation above sea level along northeast-southwest lines as shown in the following table at the points named:

	Elevation Feet
Campus and Mohawk.....	1800
Oceana, Ellick and Jaeger.....	2000
Pineville, Davy and Avondale (Ritter).....	2100
Maben, Welch and Bradshaw.....	2300
Herndon, Landgraaf and Anawalt.....	2500
Clarks Gap and Crumpler (Burkes Garden).....	3000

Evidence is not lacking that many of the streams of Wyoming and McDowell reached base-level during the formation of the Cretaceous peneplain, as both the Guyandot and Jug Fork and their larger tributaries have very sinuous courses which they have probably inherited from Cretaceous time. The present narrow, V-shaped valleys show that the streams have not advanced very far in their present erosive cycle, although longitudinally approaching maturity, as exhibited in their tendency to preserve a comparatively low gradient almost to their headwaters.

The following table, prepared by Gawthrop from careful determinations on the U. S. Geological Survey sheets, exhibits interesting features of stream flow in the two counties. The last column gives the ratio of the total distance (T. D.) to the air line distance (A. L. D.), indicating the amount the stream has deviated from a straight line in that portion designated in the first column. It is quite evident that the nearer this ratio approaches unity, the straighter its course becomes:

Table of Stream Data.

Streams.	Total Fall. Feet.	Total Distance. Miles.	Rate of Fall. Per Mile.	Air Line Distance Miles.	Ratio T. D. to A. L. D.
Guyandot River, Devils Fork to Little Huff Creek.....	640	52.5	12.2	28.0	1.9
Devils Fork to Pineville.....	270	22.0	12.3	12.0	1.8
Pineville to Baileysville.....	170	14.0	12.2	7.4	1.9
Baileysville to Little Huff Creek	200	16.5	12.1	8.6	1.9
Slab Fork, Hotchkiss to Maben.....	150	4.0	37.5	3.0	1.3
Maben to Mullens.....	175	5.6	31.3	3.8	1.5
Barkers Creek Milam Fork to Gooney Otter.....	350	2.7	130.0	2.4	1.1
Gooney Otter to mouth.....	300	4.8	62.5	3.4	1.4
Pinnacle Creek, Little Pinnacle Creek to Spider Creek.....	390	6.7	58.2	4.5	1.5
Spider Creek to Little Whiteoak Creek.....	130	4.2	30.9	3.1	1.4
Little Whiteoak Creek to mouth.	105	5.0	21.0	3.5	1.4
Indian Creek, Fort Branch to Nancy Fork	340	5.0	68.0	3.9	1.3

Streams.	Total Fall. Feet.	Total Distance. Miles.	Rate of Fall. Per Mile.	Air Line Distance Miles.	Ratio T. D. to A. L. D.
Nancy Fork to Fanny.....	120	5.8	20.7	4.2	1.4
Fanny to mouth.....	90	3.7	24.3	2.5	1.5
Clear Fork , Knob Fork School to Crane Fork.....	395	4.3	91.9	3.4	1.3
Crane Fork to Toney Fork....	180	4.8	37.5	3.7	1.3
Toney Fork to Laurel Fork....	72	2.8	25.7	2.0	1.4
Laurel Fork to Elklick Branch..	85	9.0	9.5	5.3	1.7
Elklick Branch to mouth.....	70	5.4	13.0	3.2	1.7
Laurel Fork , Franks Fork to Milam Fork	110	5.5	20.0	4.6	1.2
Milam Fork to Jesse.....	380	8.6	44.2	4.5	1.9
Jesse to mouth.....	80	6.4	12.5	3.2	2.0
Cub Creek , Upper Sturgeon Branch to Guyan.....	350	3.9	90.0	3.4	1.1
Guyan to mouth.....	120	3.3	36.6	2.8	1.2
Little Huff Creek , Road Branch to Pad Fork.....	250	3.4	73.5	2.9	1.2
Pad Fork to Muzzle Fork.....	115	4.0	28.7	3.0	1.3
Muzzle Fork to mouth.....	175	5.2	33.6	3.9	1.3
Huff Creek , Brushy Fork to Sycamore Creek.....	240	3.3	72.7	2.6	1.3
Sycamore Creek to Wyoming- Logan County Line.....	275	6.8	40.4	4.5	1.5
Wyoming-Logan County Line to mouth	250	7.8	32.1	6.9	1.1
Tug Fork , Jenkinjones to McDowell- Mingo County Line.....	1075	55.3	19.4	32.7	1.7
Jenkinjones to Black Wolf.....	500	8.6	58.1	4.5	1.9
Black Wolf to Welch.....	200	11.9	16.8	8.5	1.4
Welch to Iaeger.....	320	24.8	12.9	12.9	1.9
Iaeger to McDowell-Mingo County Line	55	10.0	5.5	6.8	1.4
Elkhorn Creek , McDowell-Mercer County Line to North Fork...	490	7.7	63.7	6.0	1.3
North Fork to Welch.....	420	14.9	28.2	8.5	1.7
Clear Fork , Coalwood to mouth....	430	8.8	48.8	6.5	1.4
Dry Fork , West Virginia-Virginia State Line to Rift.....	250	8.2	30.4	5.9	1.4
Rift to Bradshaw.....	245	14.8	16.6	8.8	1.7
Bradshaw to mouth.....	210	10.9	19.2	7.6	1.4
Panther Creek , Birchlick Branch to George Branch.....	420	5.9	71.2	3.9	1.5
George Branch to mouth.....	215	5.7	37.7	4.2	1.4

The meanderings from a straight course of the above listed streams are due largely to the fact that they have inherited their ancient base-leveled channels of the Cretaceous peneplain described on preceding pages of this Chapter, rather

than to any interruption in comparatively recent time to their direction of flow by intersection with prominent structural features. Evidence that the latter has exercised but little influence may be readily obtained in a study of the foregoing table which shows a remarkable uniformity of gradients in stream profile, the same decreasing normally from head to mouth.

DRAINAGE BASINS.

With the exception of about one-fourth square mile in the extreme eastern point of McDowell, the entire drainage of the territory of this Report reaches the Gulf of Mexico through the Ohio and Mississippi Rivers. The water is carried to the Ohio by the Guyandot River from Wyoming County; and by Tug Fork, from McDowell, the latter emptying into the Big Sandy—tributary to the Ohio—at Louisa, Kentucky.

The following table gives the area of the main drainage basins included within the two counties along with that for several tributaries, as determined by Gawthrop with planimeter from the accurate U. S. Geological Survey sheets:

Area of Drainage Basins.

Streams.	Square Miles.
Guyandot River	507.30
Huff Creek above Wyoming-Logan County Line...	35.40
Slab Fork.....	36.10
Barkers Creek.....	45.20
Pinnacle Creek.....	55.65
Indian Creek.....	41.60
Clear Fork, including Laurel Fork.....	125.10
Cub Creek.....	17.50
Little Huff Creek.....	41.10
Tug Fork in McDowell County	538.40
South Fork of Tug.....	17.90
Elkhorn Creek, including North Fork.....	71.35
Spice Creek.....	10.90
Clear Fork.....	25.10
Dry Fork in McDowell County.....	183.95
Bradshaw Creek.....	18.85
Little Slate Creek.....	15.05
Barrenshe Creek.....	9.20
War Creek.....	9.85
Big Creek above Jacobs Fork.....	34.00
Jacobs Fork in McDowell County.....	19.95
Panther Creek.....	43.90

Guyandot River.

The Guyandot River heads against Flattop Mountain in the southern edge of Raleigh County, at an elevation of 3400 feet above the sea, and flows in a general northwest direction through Raleigh, Wyoming, Mingo, Logan, Lincoln and Cabell Counties into the Ohio River at Guyandot, $2\frac{1}{2}$ miles above Huntington. Its general course through Wyoming is almost due west to Justice where it intersects the Wyoming-Mingo Line. The area of its drainage basin within the county, including the Wyoming portion of Huff Creek, is 507.3 square miles, covering the entire county. Through the latter area, it is narrow, shallow and comparatively rapid due to a rate of fall slightly over 12 feet to the mile, with a very sinuous course. Its valley walls, as also those of its tributaries, are steep and high, a feature that should cause its runoff to take place quickly. This is retarded, however, to some extent, owing to the fact that a great portion of its drainage basin within both Raleigh and Wyoming Counties is heavily forested or cut-over territory, and to the sandy and porous nature of the soil. It follows that a considerable portion of every rain-fall is absorbed by this sponge-like surface covering, a feature that tends not only to prevent many disastrous floods but also to preserve the flow of the larger streams even during periods of prolonged drought.

Its principal tributaries in Wyoming are Clear Fork, Pinnacle Creek, Barkers, Indian, and Little Huff Creeks, and Slab Fork, ranking in the order named as shown by the area of their drainage basins.

A special attempt was made to determine the existence of **river terraces** along the valley walls of Guyandot in Wyoming County. Owing to the difficulties mentioned in the discussion at the beginning of this Chapter, these efforts were not crowned with much success. However, remnants of what appears to be a fairly well defined terrace occur along this stream at the points designated below, the figures expressing their approximate elevation above sea:

	Feet.		Feet.
Justice	1030	Pineville	1315
Baileysville	1150	Sugar Run, ½ mi. West.....	1450
Bartley	1190	Elmore	1500

The figures show a gradual rise eastward up the river nearly across the county, a normal condition associated with river terraces. The writer is of opinion that this temporarily base-leveled condition has been inherited from its ancient pre-glacial channel and is very probably contemporaneous with the abandonment of Teays Valley * by the Kanawha River, the floor of the former being 250 feet higher than the present bed of the Ohio at the mouths of Guyandot and Big Sandy Rivers, at Guyandot and Kenova, respectively. Before the Glacial period, the drainage of both the Guyandot and Tug Fork of Big Sandy belonged to that of the St. Lawrence River, flowing northwestward at that high level—700 to 800 feet above the sea at Kenova—across the State of Ohio and emptying into one of the great Lakes. The formation of the Ohio River, as a direct result of the great ice and moraine dams during the Glacial period, changed the drainage of all the streams in the western half of West Virginia from that of the St. Lawrence to the Mississippi River, and thence to the Gulf of Mexico. This resulted in greatly lowering their outlets in a comparatively short period, thus largely increasing erosive action of Guyandot and Big Sandy and likewise of Tug Fork, since which time the present narrow V-shaped channel has been cut below the general level of the terrace mentioned above for the first mentioned river in Wyoming County. In the same way the terraces along the larger tributaries of Guyandot and Tug Fork may be reasonably explained.

Clear Fork.—Clear Fork, much the largest and most important tributary of the Guyandot in Wyoming, has its source at Clear Fork Gap in the northeastern point of the county, at an elevation of over 2800 feet above sea level. Its course is generally southwestward to Simon at its mouth. Here it has fallen to only about 1125 feet above sea level. The area of its drainage basin is 125 square miles, or more than double that

*M. R. Campbell, Charleston and Huntington Folios, U. S. G. S.; 1900 and 1901.

for any other tributary in the county. It is narrow, comparatively rapid and possesses a meandering channel. As with the Guyandot, it has inherited the latter feature from its Cretaceous and Tertiary cycles of erosion. The character of its drainage basin is practically the same as that outlined above for Guyandot River, and the same remarks apply as regards its run-off.

A fairly well defined **terrace** occurs along the valley walls of Clear Fork above Sunhill. Remnants of this may be observed at the elevations above sea level at the points designated below:

	Feet.
Sunhill	1255
Elklick	1275
Oceana	1275
Laurel Fork.....	1300
Toney Fork.....	1350

This terrace very probably owes its existence to the same phenomena that have been suggested above as causing the formation of the terrace along the Guyandot River. However, this does not explain the wide valley floor between Oceana and Elklick and the lower gradient along this portion of the course of Clear Fork. In the writer's judgment, this temporary base-leveled condition is not due to the same cause as suggested above for the terrace along Guyandot. In the narrows for two miles along Clear Fork above Sunhill, it appears quite probable that the Lower Dotson Sandstone, a prominent cliff-maker at this point, has been the hard stratum that temporarily suspended longitudinal erosion along the upper course of this stream and started a brief period of lateral cutting. This resulted in the formation of wide bottoms— $\frac{1}{4}$ to $\frac{1}{2}$ mile across—between Oceana and Elklick, this being one of the exceptional topographic features of the two counties under discussion. An examination of the Table of Stream Data, given on a preceding page of this Chapter, reveals an unnoraml condition in the profile of Clear Fork, in that there is quite a flattening of its gradient in the 9 miles of its course between the mouth of Laurel Fork and Elklick, the rate of fall being only 9.5 feet to the mile, as against 25.7 feet for the 2.8 miles above the mouth of Laurel; and 13 feet for the 5.4

miles below Ellick to its mouth. This feature is additional evidence of the temporary base-leveled condition that prevailed in this portion of the stream's course.

Tug Fork of Big Sandy River.

The Tug Fork of Big Sandy River has its source in the eastern edge of McDowell County at the common corner of Mercer and McDowell Counties, West Virginia, and Tazewell County, Virginia, at an elevation of slightly over 2550 feet above sea level. From this point it flows in a general north-west course to its junction with Levisa Fork at Louisa, Kentucky, forming here Big Sandy River, a direct tributary of the Ohio. From the point where it leaves the territory of this Report, it forms the State Line between West Virginia, and Virginia and Kentucky.

The area of its drainage basin in McDowell is 538 square miles, and including the 35 to 40 square miles in Tazewell County, Virginia, is about 575 square miles, above its intersection with the McDowell-Mingo County Line. This basin is very similar to that described above for the Guyandot, in that a great portion of it is either heavily forested or cut-over territory, and the soil of the same prevailing sandy type, with the exception of a few narrow belts along the crest of the Dry Fork Anticline, where a few of the larger tributaries have cut down through the Pottsville into the underlying Mauch Chunk Red Shales. Hence, the surface covering tends in a similar manner to retard the run-off after heavy rains, not only contributing to the reduction of the number of disastrous floods, but preserving its flow through periods of drought.

Although the general course of Tug and its larger tributaries is northwest, a direction of flow inherited from the north-west tilting on the upheaval of the surface at the close of the Carboniferous, as described on preceding pages, yet there are many local meanderings or deviations from this direction. The latter feature, taken in connection with the comparatively rapid rate of fall as exhibited in the table on a preceding page of this Chapter, clearly indicates that the channel has also been inherited from its ancient base-leveled stages during the formation of the Cretaceous and Tertiary peneplains.

The principal tributaries of Tug Fork in McDowell, ranked in the order of the area of their drainage basins, are Dry Fork, Elkhorn Creek, Panther Creek, Big Creek above Jacobs Fork, Clear Fork, Jacobs Fork in McDowell, Bradshaw Creek, South Fork, Little Slate, War, and Barrenshe Creeks.

The same difficulties were encountered on Tug Fork as on the Guyandot in attempting to trace **river terraces** along its valley walls or those of its tributaries. The writer found what appear to be the remnants of a fairly well defined terrace along Elkhorn Creek between Welch and Switchback at elevations above sea level exhibited by the figures opposite the points below:

	Feet.		Feet.
Welch	1360	Big Four, 0.3 mi. N. E.....	1545
Olmsted	1430	Kimball	1560
Dixopoca	1500	East Vivian	1600
Big Four, S. W. edge.....	1505	Keystone	1730
Big Four, N. W. edge.....	1520	Switchback	2115

The formation of this terrace appears to be synchronous with that outlined above for the one along the Guyandot River, since it has practically the same elevation above sea level at Welch, as the latter just east of Pineville to the northeastward. However, it is barely possible that this terrace along Elkhorn may be due to a combination of structural influence and the hard sandstone ledges cropping along the Norfolk & Western Railway grade in the vicinity of Welch. An examination of the contours on the No. 3 Pocahontas Coal on Map II, accompanying this Report in a separate atlas, shows a considerable flattening in the northwest dip of the strata along Elkhorn Creek, just above Welch, a normal structural feature associated with the southwest termini of the Mullens Syncline and Anticline. The latter feature, acting in conjunction with the sandstone ledges mentioned, might be sufficient to account for the temporary base-leveled condition along this stream. In support of the foregoing theory, there is the apparent absence of this terrace along the valley walls of Tug Fork on below Hemphill. At least, if any remnants are preserved, none was recognized in the rather limited time available for field work in this area where more important problems of an economic nature required solution.

TOPOGRAPHIC FEATURES.

The topography of the Wyoming-McDowell area is very similar to that in Boone, Logan and Mingo Counties, described in previous Reports, in that it is generally steep and rugged. The streams have cut their channels through the strata in such a way as to produce high "hog-back" ridges and deep, sharp, V-shaped valleys. There is one marked exception to the last mentioned feature; viz, the wide bottoms along Clear Fork in Wyoming County, between Oceana and Ellick, described on a preceding page of this Chapter under the account of this stream and reasons suggested for its occurrence. Along the western margin of the two counties, the ridge and hill summits range from 900 to 1200 feet above the floors of the valleys, while in the eastern portion, 800 to 1000 feet above the same datum are the prevailing figures.

The ridge summits are generally so sharp that little or no attempts have been made to cultivate them, except in the southeast portion of Barkers Ridge District, Wyoming, and the southern part of Sandy River District, McDowell. Owing to their wooded nature, the mountain sides at a glance give the impression that their slopes are uniformly steep, but these are frequently interrupted by narrow flat benches, resulting from the crops of soft shales, and coal seams which separate the great sandstone ledges composing the major portion of the surface rocks. There are many divides several hundred feet below the adjoining ridge summits, as also many sharp pointed knobs extending an equal distance above the same ridges. The valley floors, though narrow, furnish the sites for the numerous coal mining towns and homes for the natives.

As mentioned on preceding pages of the Chapter, geologic structure has exerted only a slight influence on the topography of the two counties, there being practically little difference in the elevation of the ridge summits along the crest of the great Dry Fork Anticline, and that for those three to four miles each side of this fold. The same is true along the axes of the Pineville and Mullens Anticlines and Synclines. Hence, it follows that the topography does not give any clues as to the structure of the region. There is, however, an important exception in

which it appears that structure has played no small part in shaping the topography; viz, the valley of Dry Fork between English and Bradshaw and the western half of the drainage basin of Bradshaw Creek, McDowell County, which is situated on a marked structural terrace as may be observed on Map II by the wide divergence of the 1200 and the 1300-foot contours of the Sewell Coal. Here, Bradshaw Creek in the upper half of its course flows in a southeast direction nearly along the strike of the strata, then turns sharply at right angles to the northward down the structural slope. The same is true of Groundhog Branch, another tributary of this creek, while Dry Fork follows closely along the axis of the Bradshaw Syncline between the points mentioned. These features can hardly be explained on any other basis than structural influence.

The lack of waterfalls and extensive rapids along the streams has already been explained and accounted for on preceding pages of this Chapter. The rapid rate of fall as revealed by the table, also given on a previous page, indicates that a long period will have to elapse before the streams have base-leveled the longitudinal slopes of their channels sufficiently to do much work of lateral erosion and thus effect a marked change in the topographic forms of the region. In other words none of the streams is yet carrying its maximum load of sediment. They are rather in the period of infancy or youth as regards the work of erosion yet to be accomplished.

Stream Piracy.—No marked illustration of stream piracy was observed in Wyoming, but in McDowell County, a typical example of this form of erosive action occurs at the “break-through” of Dry Fork, one mile due north of Berwind. Here Big Creek, aided by Dry Fork, has cut away the low divide and robbed the latter of its drainage locally, the entire flow of which, except in time of floods, passes along the bed of the former for one-eighth mile to its mouth where it again resumes its old channel.

In the southeastern edge of McDowell, the dividing ridge between the waters of Tug Fork and Bluestone River is constantly shifting eastward owing to the swifter and more rapid erosive action of the tributaries of the former stream, thus gradually increasing the area of the drainage basin of Tug

Fork. It is only a matter of a short time, reckoned from a geological standpoint, when an act of stream piracy will be performed at "Low Gap" in Big Stone Ridge, 2 miles southwest of Boissevain, Tug here beheading Laurel Fork of Blue-stone.

An examination of the topography, just across the State Line from the southern edge of McDowell, shows a similar condition prevailing to that last described, in that the waters of Dry Fork of Tug are rapidly eating their way back into the high plateau drained by Clinch River, which will finally end in the beheading of the latter stream by the former.

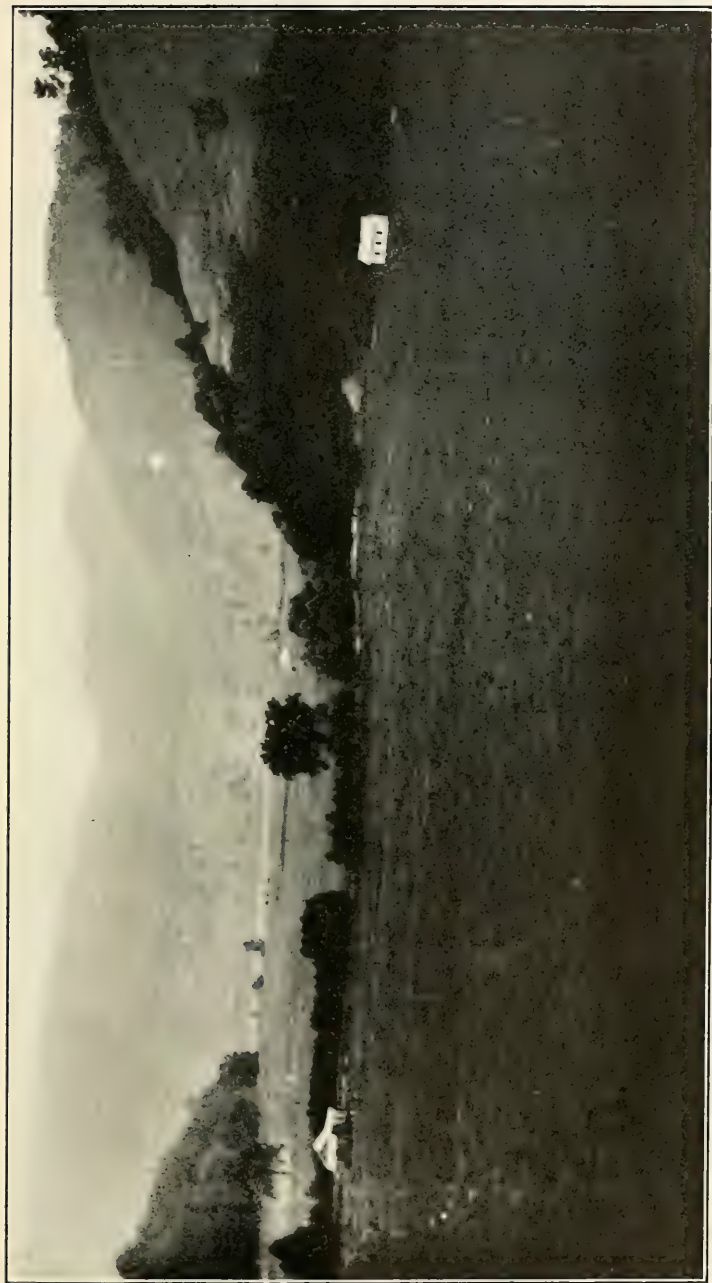


PLATE III—Showing wide bottoms along Clear Fork (see explanations under description of this stream: in Chapter II), looking east from point just west of mouth of Lower Road Branch.

PART II.

Geology.

CHAPTER III.

STRUCTURE.

The general principles of geologic structure, the methods used in representing it and the definition of terms used in describing the same, have been given by the writer¹ in a previous Report of the State Geological Survey, to which the reader is referred.

METHOD OF REPRESENTING STRUCTURE.

Owing to the absence of faults and intense folding, resulting frequently in "overturns," only one method of representing the structure of the two counties in question has been found necessary in this Report; viz, the use of contours on the definitely recognized and widely persistent **Sewell** and **No. 3 Pocahontas Coal beds**, the best available "key-rocks" in the area. It was not feasible to base the contours on either of these seams exclusively, owing to the general northwest dip across the area, thus exposing the entire thickness—3800 to 4000 feet—of Pottsville Measures. In the southeast portion of both counties, the latter coal crops to the surface. Hence in this region it was quite advantageous to base the structure on it westward to its 1000-foot contour above the sea. The same is true for the Sewell Coal, ranging from 725 to 930 feet higher in the measures, over a large part of the area west of the contour last mentioned. The elevation of the base of these coals above sea level, as also the area covered by each set of contours, may be observed in detail on Map II which accompanies this Report in a separate atlas, the **red** contour lines being based on the No. 3 Pocahontas Coal, and the **green** on the

¹Ray V. Hennen, Marshall-Wetzel-Tyler Report, pp. 59-60; 1909.

Sewell. The one exception to the last statement occurs in the extreme northwest point of Oceana District, Wyoming County, where the Sewell Coal has passed below sea level. Here the green figures, preceded by a **minus sign**, in **parentheses** (—), accompanying contours of the same color, indicate feet **below sea level**. The contour interval is 50 feet in each set, thus making it possible to determine the approximate position of any horizon by a liberal use of the tables of intervals given below. Elevations were determined where possible, directly on the "key-rock" coals at known points on the topographic map. Where such points were not available, then the aneroid was used, care being exercised to check the same frequently on known spirit-level elevations. In localities where one or both of the two coals were below drainage, or could not be found in the hills, then resort was made to levels on other formations and the logs of diamond drill borings, and the true position of the "key-rock" coals determined by intervals.

Owing to the rapid thickening of the Pottsville Measures both southeastward and southwestward across the area, the interval between known members does not hold good over a very large portion of either county. Hence, instead of using constant intervals between the Sewell and other known beds, and likewise, the No. 3 Pocahontas, in determining the final position of the contour lines on Map II, a series of intervals for different localities in the area had to be devised. Thus the intersections of the 1000-foot contour of the No. 3 Pocahontas Coal with those on the Sewell of higher and higher elevation to the southwestward is explained on the basis of a constantly increasing interval in this direction between the two beds.

The first of the two following tables shows the intervals above and below the base of the Sewell Coal to the other formations named, largely determined by sections measured at the points designated. The second table in a similar manner gives intervals above and below No. 3 Pocahontas Coal. It is readily observed that the figures increase both to the southeastward and southwestward, the greatest expansion apparently taking place in the southern edge of Sandy River and Big Creek Districts, McDowell County. These intervals were used in outlining the position of each set of structure contours on Map II:

Intervals Above and Below No. 3 Pocahontas Coal.

Formations, in Descending Order.	Pineville.	Saulsville.	Maben.	Mullens.	Herdon.	Clarks Gap.	Pinnacle Creek at mouth of Spider.	Pinnacle, on Whiteoak Branch.	Davy.	Welch.	North Fork.	Coaldale.	Gary.	Jenkins Jones.	Coalwood.	English.	Berwind.	Bearwallow Knob.	Formations, in Descending Order.
Cuyandot Sandstone, top.	75	75	890	900	950	1025	925	975	1000	1025	1025	1050	1050	1075	1065	1000	1040	1250	Cuyandot Sandstone, top.
Sewell "B" Coal.	800	800	815	825	890	940	850	900	930	950	950	975	975	975	990	920	965	1080	Sewell "B" Coal.
Sewell (Davy) Coal.	725	725	740	750	800	840	750	800	830	850	850	875	875	875	900	820	865	930	Sewell (Davy) Coal.
Welch Coal.	.....	.....	.....	.....	.....	.....	.....	770	760	780	780	800	800	810	800	740	785	860	Welch Coal.
Little Raleigh Coal.	.....	.....	.....	.....	.....	.....	.....	635	700	700	720	725	725	735	740	690	735	780	Little Raleigh Coal.
Beckley-War Creek Coal.	585	565	575	560	635	670	610	635	600	600	620	625	625	630	630	580	625	700	Beckley-War Creek Coal.
Fire Creek Coal.	500	480	475	480	550	580	525	550	500	500	510	515	510	520	530	500	525	580	Fire Creek Coal.
Little Fire Creek Coal.	410	410	400	420	470	480	425	450	500	470	480	485	470	480	500	470	490	510	Little Fire Creek Coal.
No. 9 Pocahontas Coal.	.....	.....	.....	.....	.....	375	.....	320	370	370	380	400	380	400	400	380	380	430	No. 9 Pocahontas Coal.
No. 8 Pocahontas Coal.	.....	.....	.....	.....	.....	.....	.....	.....	300	300	320	350	330	350	325	320	325	.....	No. 8 Pocahontas Coal.
No. 7 Pocahontas Coal.	.....	180	180	225	260	300	.....	240	230	235	270	300	250	300	260	250	260	330	No. 7 Pocahontas Coal.
No. 6 Pocahontas Coal.	135	140	125	150	180	200	150	150	150	160	175	200	160	180	160	150	170	230	No. 6 Pocahontas Coal.
No. 5 Pocahontas Coal.	100	100	100	120	130	140	.....	.....	100	.....	.....	.....	100	120	120	100	110	120	No. 5 Pocahontas Coal.
No. 4 Pocahontas Coal.	700	.....	60	70	.....	.....	.....	65	65	65	70	80	75	90	60	70	70	90	No. 4 Pocahontas Coal.
No. 3 Pocahontas Coal.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	No. 3 Pocahontas Coal.
No. 2 Pocahontas Coal.	.....	.....	55	55	55	60	.....	.....	80	.....	60	60	.....	60	.....	.....	.....	70	No. 2 Pocahontas Coal.
No. 1 Pocahontas Coal.	.....	.....	90	90	110	115	.....	.....	.....	.....	.....	90	.....	90	.....	.....	.....	.....	No. 1 Pocahontas Coal.
Landgraff Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	125	125	.....	130	.....	.....	.....	.....	Landgraff Coal.
Keystone Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	150	150	.....	150	.....	.....	.....	.....	Keystone Coal.
Simmons Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	180	200	.....	200	.....	.....	.....	.....	Simmons Coal.
Squire Jim Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	300	.....	.....	.....	.....	Squire Jim Coal.

The sections and bore hole records from which the intervals in the accompanying tables were determined are given on subsequent pages of Chapters IV and X, respectively, to which reference is made for details by those desiring to make local investigations. In order to fix the approximate elevation of a coal, sandstone or shale at any point in the area, subtract or add, as the case may be, its interval for that region above or below the "key-rock" from the elevation of the latter as exhibited by the structure contours for that point. If the formation is not listed in the foregoing tables, then its interval may be found readily either in the General Section of the Pottsville Measures, published at the beginning of the next Chapter, or in a possible section for that region, referenced in the Index.

DETAILED STRUCTURE.

General Features.

A glance at the structure contours on Map II shows that the strata of Wyoming and McDowell Counties have been only slightly folded or disturbed from their original position of deposition by either lateral or upward movements of the earth's crust. There is a gradual rise at a very low angle with the horizontal from the northwest margin of the area to the southeast edge, with only four or five slight interruptions by low anticlines and synclines, the one exception being the Dry Fork arch which rises to considerable magnitude. Over a great portion of the area the pitch is not excessive, being hardly perceptible to the eye, so that careful levels were necessary to determine the direction and rate of dip. At other points, especially along both flanks of the Dry Fork Anticline, the pitch is very distinct to the eye. The lowest point structurally is found in the extreme western point of Oceana District, Wyoming County, where the Sewell Coal has descended to slightly over 150 feet below sea level; and the highest, is on the crest of the Dry Fork Anticline, 2.6 miles due south of Black Wolf (Dearing P. O.), McDowell County, where the No. 3 Pocahontas Coal has risen to slightly over 2600 feet

above sea level. At the latter point the horizon of the Sewell Coal should come at least 900 feet higher, or at an elevation of 3500 feet above sea level. This makes a total dip of 3650 feet for the Sewell Coal horizon in an air line distance of $33\frac{1}{2}$ miles from the point last mentioned to the western end of Oceana District, or at the rate of 109 feet to the mile.

The folds, being roughly parallel to the trend of the Appalachian Mountain System, extend in a northeast-southwest direction. The following attain sufficient importance to receive names:

Anticlines.	Synclines.
Pineville.	Pineville.
Mullens.	Mullens.
Bradshaw.	Bradshaw.
Dry Fork.	

In addition to the foregoing there are two or three structural terraces that will be described briefly on subsequent pages of this Chapter.

Anticlines.

Pineville Anticline.—The Pineville Anticline, not previously described, is a low fold entering Wyoming from Raleigh County just east of Clear Fork Gap on the head of Clear Fork. From this point it bears south 10 to 15 degrees west for 6 miles, crossing Milam Fork of Laurel, $\frac{1}{2}$ mile above the mouth of the former stream, veers almost due south for $4\frac{1}{2}$ miles, and again resumes a southwest course, intersecting Guyandot River one mile east of Pineville, from which place it is named. Continuing its southwest course, it crosses Indian Creek coincident with the Baileysville-Center District Line, and after entering McDowell County, practically dies out one mile northward from Davy.

The fold is not symmetrical about its axis, in that the dip is not so rapid on its eastern flank and continues in this direction a distance ranging from $\frac{1}{2}$ to less than 2 miles, while on its western slope the pitch continues even beyond the western margin of the territory of this Report to the axis of the Coalburg Syncline, 2 miles southeast of Logan, Logan County, a

distance of 31 miles. The surface geology along its crest is that of the Kanawha, New River and Pocahontas Groups, all the divisions of the Pottsville Measures being represented. Where its axis enters Wyoming from Raleigh, the Sewell Coal has an elevation of over 1500 feet above sea level. The axis rises southwestward and at Milam Fork, the coal has risen to 1660 feet; and at its intersection with the Slab Fork-Center District Line, one mile southwest of Saulsville, to slightly over 1700 feet. Southwestward from the latter point, the axis remains almost horizontal to its intersection with Pinnacle Creek, where it suddenly dips southwestward, bringing the Sewell Coal down to 1540 feet in Indian Creek, and to about 1440 feet at its southwest terminus, one mile northward from Davy.

As to the age of this fold, it was no doubt a direct result of the intense folding associated with the formation of the Appalachian Mountains at the close of the Carboniferous. These remarks apply to all the other flexures in the two counties.

Mullens Anticline.—The Mullens Anticline, so designated from the town through which it passes in its northeast-southwest course across the eastern portion of Wyoming County, has not been previously described. It enters the latter area from Raleigh 2.4 miles east of Maben, bears south 15 to 20 degrees west to Mullens, where it veers more to the west, following closely the valley of Guyandot River to a point $\frac{1}{2}$ mile west of Elmore, and crosses Pinnacle Creek 1.5 miles above the mouth of Little Whiteoak, and the latter stream, $\frac{3}{4}$ mile above the mouth of Jenny Branch. It continues its southwest course, crosses Indian Creek, 0.6 mile southeast of Fort Branch, and finally dies out in the north edge of McDowell County.

This anticline is not symmetrical about its axis, the northwest slope being much steeper than the southeast and continuing more than double the distance away from the axis without a synclinal interruption than obtains on the eastern flank.

The rocks cropping along its crest in the territory of this Report are exclusively in the New River and Pocahontas

Groups, the Kanawha having been eroded even from the crest of the highest knobs. Its age is practically the same as outlined for the Pineville Arch.

The No. 3 Pocahontas Coal has an elevation of slightly over 1600 feet above sea level at its intersection with the Raleigh-Wyoming County Line. Southwestward the axis dips gradually, bringing the coal down to 1500 feet at Elmore; 1480 at Pinnacle Creek; and 1250 feet at Indian Creek.

Bradshaw Anticline.—The Bradshaw Anticline is a comparatively low spur—4 to 5 miles in length—jutting off the general western slope of the greater Dry Fork arch, and having its western terminus one mile northeast of Bradshaw, and it is named from the latter place. Its course is almost due east and west, nearly at right-angles with the general strike in the two counties. It is almost symmetrical about its axis, the pitch of the strata being about the same in rate and extent. The outcropping rocks along and near its crest are in the New River and Pocahontas Groups, the Kanawha division of the Pottsville just missing the summits of the highest hills. The Sewell Coal has an elevation of about 1300 feet above sea level at its western extremity. From the latter point the axis rises gradually eastward at the rate of 60 to 70 feet to the mile, elevating the last mentioned coal to 1700 feet on the head of Harmon Branch of Barrenshe Creek.

An examination of the drainage in the upper course of Bradshaw Creek, and Dry Fork between English and Bradshaw, and likewise the direction of the contours of the Sewell Coal in the same region, as exhibited on Map II, leads to the conclusion that local structure has had much influence in determining its final configuration. Its effect on the course of the former stream has already been discussed on a preceding page in Chapter II, under the description of "Topographic Features." The course of Dry Fork suddenly swerves from its general northwest direction above English to almost due west from the latter point to Bradshaw, following closely along the westward dipping axis of the Bradshaw synclinal basin. In this portion of Dry Fork, the north side tributaries have an almost due south direction, in harmony with the structural slope for that locality. These facts all tend to show that the

Bradshaw Anticline aided by the syncline influenced the original course of Dry Fork and was probably formed during the great Appalachian Mountain upheaval near the close of the Carboniferous, as the channels of all the larger streams of Wyoming and McDowell have been inherited from those occupied during the formation of the Cretaceous and Tertiary peneplains, as described on preceding pages in Chapter II.

Dry Fork Anticline.—The Dry Fork Anticline of White² is the most important fold from the standpoint of magnitude within the territory of this Report, as graphically exhibited on Map II. It enters the southern edge of McDowell County from the State of Virginia, one-half mile west of the intersection of Beech Fork with the State Line; bears almost due northeast to the $81^{\circ} 30'$ meridian of longitude, and intersects Dry Fork at the mouth of Beech Fork; Jacob Fork, 0.2 mile southeast of Squire; Cucumber Creek, 1.5 miles southeast of Cucumber; and the meridian mentioned, $\frac{1}{2}$ mile north of Laurel Branch of South Fork. Here it veers more to the east and crosses South Fork of Tug at the mouth of Milam Branch; Tug Fork $1\frac{1}{4}$ miles south of Anawalt; and the State Line, 0.8 mile southward from the common corner of McDowell, Mercer and Tazewell Counties. On entering Virginia again, its course is almost due east to its intersection with Mill Creek, $\frac{1}{2}$ mile northwest of Coopers, beyond which point it was not traced. While in the field, the writer was inclined to attribute the wide **structural terrace** along the western edge of Mercer to be an extension of this arch to the northeast, but the position of its axis as outlined on Map II seems the correct interpretation. In fact it dies out in the greater Abbs Valley Anticline of Campbell³ in the vicinity of Freeman, and for this reason might be considered a spur off the latter fold, the Pocahontas Basin occupying the region between the two arches.

This fold is fairly symmetrical about its axis, the rate of dip being about the same on each flank. That, however, on the western slope is much greater in extent, reaching to the axis of the Coalburg Syncline, 2 miles southeast of Logan,

²I. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 18-19; 1908.

³M. R. Campbell, Pocahontas Folio, U. S. Geol. Survey; 1895.

Logan County, a distance of $45\frac{1}{2}$ miles to the northwestward, as against a distance not much exceeding a half dozen miles of uninterrupted pitch on the southeast slope.

The surface geology along and near the crest of the Dry Fork Anticline is in the New River and Pocahontas divisions of the Pottsville, and the upper portion of the Mauch Chunk Series.

The Pocahontas No. 3 Coal, the "key-rock" on which the structure contours on Map II are based in this portion of McDowell, has an elevation of about 2025 feet at the point where the axis of the arch intersects the Tazewell-McDowell County Line. The axis rises rapidly northeastward from the latter point to a dome, one mile west of the mouth of Spice Creek, and bringing the last mentioned coal up to an elevation of slightly over 2600 feet above sea level. Northeastward from its structural summit, the axis dips gently, lowering the same coal to about 2525 feet above sea level at its intersection with South Fork; 2490 feet at Tug Fork; and 2450 feet at the McDowell-Mercer County Line.

On the summit of the dome-like crest of the Dry Fork Anticline, above mentioned, the horizon of the Campbell Creek (No. 2 Gas) Coal belongs at least 2500 feet higher than the No. 3 Pocahontas seam, or at an elevation of slightly over 5100 feet above sea level. If a straight line were drawn from the crest of this dome northwestward a distance of $45\frac{1}{2}$ miles to the axis of the Coalburg Syncline, 2 miles southeast of Logan, it would intersect strata constantly dipping in the same direction. At the latter point the Campbell Creek (No. 2 Gas) Coal has dipped to an elevation of slightly over 400 feet above sea level, making the total pitch between the two extremes amount to 4700 feet, or slightly over 100 feet to the mile. A glance at Map II shows that this rate is not uniform, being more than double the figures last given for the first three miles northwest of the Dry Fork anticlinal summit.

As suggested in Chapter II and in this Chapter, under the description of the age of the Pineville arch, the formation of the Dry Fork Anticline, begun at the close of the Carboniferous, may be still progressing slowly.

Synclines.

Pineville Syncline.—The Pineville Syncline, not formerly described, is a comparatively low downward fold between the crests of the Pineville and Mullens Anticlines, its formation being contemporaneous with that for these arches. Its axis enters Wyoming from Raleigh County about two miles south-east of Clear Fork Gap; bears southwestward, crossing Laurel Fork about one-half mile below the mouth of Lewis Fork, and Milam Fork, 1 mile west of Polk Gap, intersecting Marsh Fork, 0.3 mile northwest of Saulsville, and the Guyandot River, 1.5 miles southeast of Pineville, from which place it is named. It continues its southwest course from the latter river, crossing Indian Creek just below Woosley P. O., and finally dies out on the head of Davy Branch of Tug, in the north edge of McDowell County. It is non-symmetrical about its axis, the pitch on its eastern flank being much steeper and prolonged over thrice the distance without interruption than obtains on the western slope. The outcropping rocks in this Basin are in the Kanawha, New River and Pocahontas Groups, the upper portion of the latter division of the Pottsville just being exposed at the fold's intersection with Guyandot River and Pinnacle Creek. It brings the Sewell Coal to an elevation of slightly less than 1500 feet above sea level at its intersection with the Raleigh-Wyoming County Line. Southwestward, the axis rises gradually to a point $\frac{3}{4}$ mile southwest of Saulsville, bringing the same coal up to an elevation of 1700 feet above the sea. Continuing southwest, the axis remains almost horizontal to near the Guyandot River, where it begins to dip gently in the same direction, bringing the Sewell Coal down to 1490 feet above the sea at Indian Creek, and to 1440 feet at Davy Branch.

Mullens Syncline.—The Mullens Syncline is a low downward fold lying close to the east side of the anticline of the same name in the southeast portion of Wyoming County, its formation being contemporaneous with that of the latter arch. As this Basin has not been previously described, it is herein designated from Mullens, near which it passes. This struc-

tural trough enters the area from Raleigh near the intersection of Allen Creek with the county line; bears southwestward to an intersection with Guyandot River, $\frac{1}{2}$ mile southeast of the mouth of the former stream; crosses Barkers Creek, $\frac{3}{4}$ mile northwest of Bud, and Pinnacle, $\frac{3}{4}$ mile above the mouth of Spider Creek, finally dying out on the head of Browns Creek in the northern edge of McDowell County. The fold is non-symmetrical about its axis, the dip of the rocks on the east slope being much more rapid and prolonged over a greater distance than obtains on its western flank. It is very similar in this respect to the Pineville Basin described above.

The surface rocks along and near this trough are in the New River and Pocahontas Groups. The No. 3 Pocahontas Coal has an elevation of about 1570 feet above sea level where the fold crosses the Raleigh-Wyoming County Line. From this point, the axis dips southwestward, bringing the same coal down to about 1425 feet above the sea at Barkers Creek; 1400 feet at Pinnacle; and 1240 feet at the Wyoming-McDowell County Line.

Bradshaw Syncline.—In the southwestern portion of McDowell County, there is a low downward fold, extending roughly along the valley of Dry Fork, and within one-half mile of the town of Bradshaw, and it is designated the Bradshaw Syncline from the latter place. Its northwest terminus is near Beartown, from which point it bears southeastward roughly parallel and along the valley of Dry Fork for a distance of six to seven miles, terminating against the steep western slope of the Dry Fork Anticline, 1.5 miles southward from Yukon. Its formation is contemporaneous with that for the anticline of the same name, an account of which is given on a preceding page.

Along this structural trough the surface rocks are in the Kanawha and New River Groups. The Sewell Coal, the "key-rock" for this region, has an elevation of about 1200 feet above sea level at its northwest terminus. The axis rises gradually southeastward, bringing the same coal up to an elevation of 1250 feet above the sea, 0.4 mile south of Hurricane Branch; about 1310 feet, at its second intersection with Dry Fork,

slightly over a mile east of Bradshaw; and 1600 feet, southward from Yukon.

Structural Terraces.

The most pronounced structural terrace in the area is that shown in the southeast edges of Wyoming and McDowell by the wide divergence of the 2300 and the 2500-foot contours of the No. 3 Pocahontas Coal as exhibited on Map II. It develops into an almost horizontal bench eastward from Clarks Gap and for this reason it could be well named the **Clarks Gap Structural Terrace**. The marked flattening in this region has no doubt played no small part in the preservation of the large flat area of the old Cretaceous peneplain from erosion in the extreme eastern point of McDowell County, although assisted greatly by the immediately underlying cap of hard Welch and Upper Raleigh Sandstones.

The intersection of the Mullens Anticline with the general northwest structural slope prevailing in the two counties has produced a flattening of the dip in the vicinity of Welch, between Capels at the mouth of Shannon Branch and Olmsted on Elkhorn Creek.

The structural terrace on Bradshaw Creek, in the southwestern portion of McDowell County and its influence on the drainage of that region have already been discussed on preceding pages of Chapter II, under "Topographic Features".

On the headwaters of the stream last mentioned, the direction of the contours on the Sewell Coal and the rapid southeast rise indicated for the latter along the McDowell-Buchanan County Line from Paynesville to the southeast corner of Sandy River District, are evidence of the existence of a considerable anticline, the axis of which is located in Virginia and is roughly parallel to the State Line. The structural terrace on the headwaters of Little Slate Creek, as exhibited by the wide divergence of the 1600 and 1700-foot contours of the Sewell Coal, appears to be the result of a marked flattening along the crest of this arch. In the region between Paynesville and Bearwallow Knob, there is a very great thickening of the measures intervening between the Sewell and

Gilbert Coals. For this reason the northwest dip of the strata, cropping along the summit of this high dividing ridge, is much greater than that shown by the structure contours as outlined on Map II. In fact the rate of expansion of the Pottsville strata in this locality was the greatest noted in any portion of the two counties.

Unconformities.

There is a marked and widely extended unconformity at the junction of the Pottsville with the Mauch Chunk Series in the territory of this Report as revealed from stratigraphic evidence. The latter series does not get above drainage in Wyoming, but in the southeastern portion of McDowell County, its crop is exposed in several narrow belts along the Dry Fork Anticline, and it has been penetrated by several of the coal test borings. The interval between the No. 3 Pocahontas Coal and the first red shale at the top of the Mauch Chunk is both variable and irregular here, ranging from 125 to over 350 feet. This feature can hardly be explained on any other basis than that of unconformity. Evidence of erosion at the line of contact is also not lacking, although there is no marked discordance in the dip of the Pottsville and that of the Mauch Chunk strata. There are numerous points in both counties where the exposed beds of the former series reveal slight local unconformities by the temporary absence of coal seams and sandstone ledges, thus causing frequent variations of the interval between well known members. These, however, are not so extensive as to warrant any further description, since they may be attributed to a local shifting of currents rather than to irregular vertical movements of the land areas.

Absence of Faults.

There appears to be a complete absence of faults, as not anything even approaching a break in the strata was observed in either Wyoming or McDowell County. Just across the State Line, however, a great thrust fault develops along the northwest flank of the Abbs Valley Anticline, in the vicinity

of Boissevain, 3 miles southwest of Pocahontas. It bears south 55 to 60 degrees west, roughly parallel with the State Line, and, at the point where it intersects Jacob Fork of Dry Fork, misses the southeastern edge of McDowell County less than 2000 feet. Hence, it is quite evident that the territory of this Report is barely west of the great series of faults associated with the formation of the Appalachian Mountain System. The fault mentioned above has been briefly described herein for the reason that it has played no small part in the preservation of the coal measures immediately to the northwest in McDowell, in that the elevation of these measures was considerably lowered, thus greatly retarding erosive action. This break in the strata could be aptly designated the "**Boissevain Fault**", since it has not previously been named, although described by M. R. Campbell in the Pocahontas Folio of the United States Geological Survey in 1895.

CHAPTER IV.

STRATIGRAPHY—GENERAL SECTIONS OF THE POTTSVILLE MEASURES.

INTRODUCTION.

In Wyoming and McDowell Counties, the outcropping strata belong almost wholly in the Pennsylvanian. There are Quaternary deposits along the streams, and, in the southeastern portion of the latter county, a few narrow belts of the Mississippian along the crest of the Dry Fork Anticline, where the stream valleys have been eroded below the base of the Pottsville into the upper portion of the Mauch Chunk Series. There are no deep borings within the area to determine the thickness and character of the known older rocks lying below the latter formation. The following standard classification, based on contained fossil plant and animal life in the rocks themselves, includes all the strata that will be described in the four following Chapters:

Quaternary.—Largely present life.

Paleozoic.—Old forms of life.

Both the Pennsylvanian and the Mississippian are contained within the Paleozoic division. Their succession and the subdivisions exposed at the surface in the territory of this Report, in descending order, are as follows:

	{ Allegheny Series.	
Pennsylvanian	{ Pottsville Series	Upper, or Kanawha Group.
		Middle, or New River Group.
		Lower, or Pocahontas Group.
Mississippian	{ Mauch Chunk Series.	

The Quaternary deposits, comprising the alluvial soils as classified on the Soil Map of the area, represent the unconsoli-

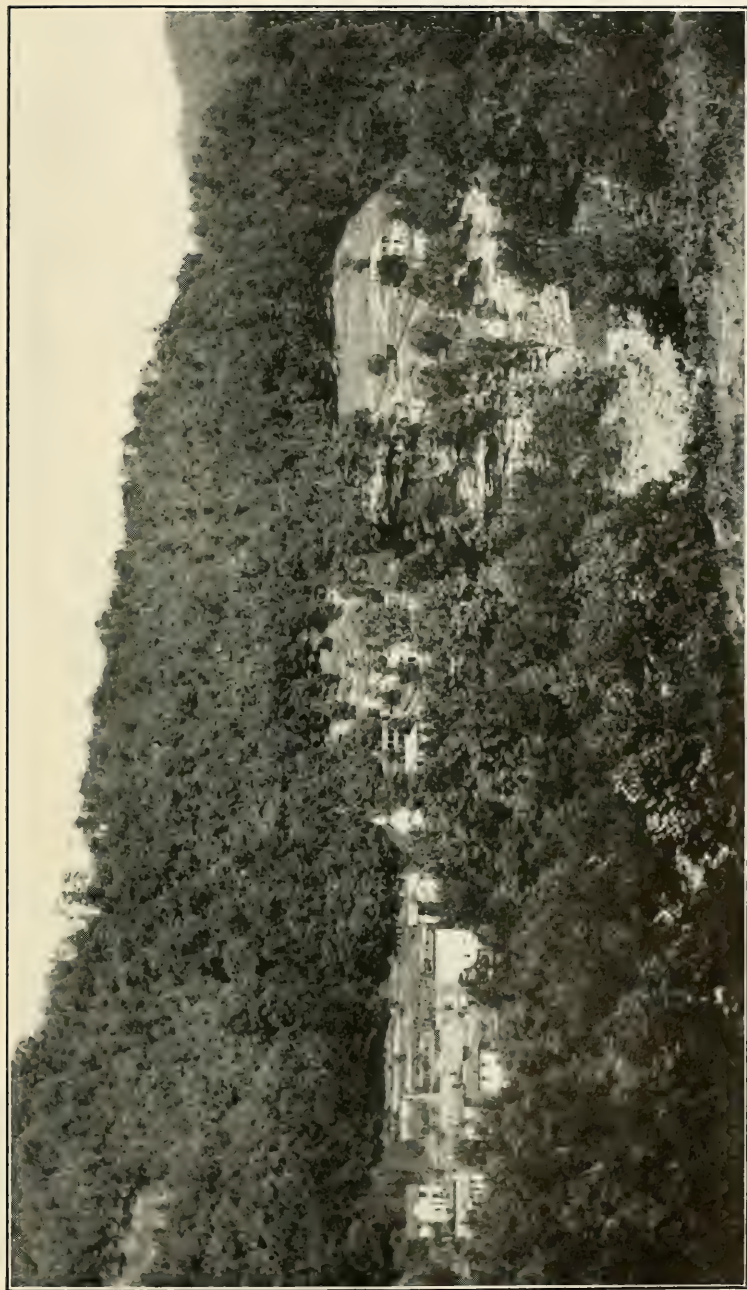


PLATE IV—Showing Pineville and topography of the New River Group, "Castle Rock" (Pineville Sandstone) in foreground, looking north from south side of Guyandot River.

dated clays, gravel and sand beds along the valley floors and terrace remnants of the larger streams, and are shown in detail on Map II. The Allegheny Series, one of the upper divisions of the Pennsylvanian, occurring within the area, may once have covered both counties, but at present it is represented by only a few scattered remnants capping the summits of the highest knobs along the dividing ridge between the waters of Buffalo Creek and Pond Fork, and Huff Creek, in the northern edge of Oceana District, Wyoming County, as also Burning Knob, as outlined in detail on Map II. As it is quite difficult to differentiate these isolated deposits, the data secured concerning them being very meager, they will be described briefly in Chapter X, under the discussion of the coal resources of the area.

The lowest and oldest surface rocks in the area are the Mauch Chunk Red Shales which crop to the surface in narrow belts along the crest of the Dry Fork Anticline in the southeastern portion of McDowell County. These will be described in Chapter VIII.

The Pottsville Measures, or basal formation of the Pennsylvanian, constitute at least 95 per cent. of the outcropping rocks, the entire group being represented in Wyoming and McDowell Counties. This formation has been very appropriately divided by I. C. White¹ into three great groups, in descending order, as follows:

Pottsville Series....	Upper...	Beaver Group..... (Kanawha Series)	{ Homewood Sandstone Stage. Mercer Stage. Connoquenessing Sandstone Stage.
	Middle...	New River Group....	{ Nuttall Sandstone. Sewell Coal. Raleigh Sandstone. Beckley Coal. Quinnimont Sandstone and Shales. Fire Creek Coal.
	Lower....	Pocahontas Group.....	{ Flattop Mountain Sandstone. Pocahontas Coals, Nos. 6, 5, 4, 3, 2, and 1, with intervening sandstones and shales. Pocahontas Sandstones.

¹Vol. II(A), W. Va. Geol. Survey, p. 13; 1908.

In the above arrangement, the name given to each of these groups was taken from the region where its strata were first studied and classified.

In the territory of this Report, the crop of the Kanawha Group is confined to the western half of each county, and the detailed description of its members will be given on subsequent pages in Chapter V. The New River beds crop entirely across—east and west—both counties and their detailed description will be given in Chapter VI. The Pocahontas Measures crop in the southeastern portion of each county, and are described in detail in Chapter VII.

A number of sections, showing the thickness, character and succession of the several members of the Pottsville Measures, were made throughout the area, some being obtained in ravines and others down the steep mountain sides. These have been supplemented by the logs of diamond drill borings wherever possible, and a discussion of these sections is given in this Chapter. For comparative purposes, the following general section of the entire Pottsville rocks has been compiled by the writer from the results of the detailed investigations of the State Geological Survey to date, the stratigraphic nomenclature being based on that of previous Reports. The thicknesses given for the column from which the totals are reckoned are slightly less than the maximum development within the area. The Kanawha Group differs little from the general section given for these measures in the Logan-Mingo Report², but in the New River and Pocahontas, some marked revisions are made in the correlations of their members from that hitherto published, as also the addition of much more detail:

²Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey; pp. 101-104; 1914.

General Section of the Pottsville Measures in Wyoming and McDowell Counties.

	Thickness Feet.	Total Feet.	
Kanawha Group (1830 feet).			
Sandstone, Homewood, massive, grayish white, capping knobs, N. edge, Oceana District	75 to 100	100	
Kanawha Black Flint, marine fossil horizon, not seen in area.....	0 to 10	110	
Coal, Stockton, multiple-bedded, splinty layers, mined extensively into the Kanawha Valley.....	0 to 10	120	120'
Shale, sandy, with impure fire clays.....	25 to 50	170	
Sandstone, Upper Coalburg, coarse, massive, gray, often weathering into "chimney rock" columns on hill summits..	50 to 80	250	
Shale	5 to 10	260	
Coal, Coalburg, multiple-bedded, splinty layers, mined extensively in Kanawha Valley	2 to 10	270	150'
Fire clay, impure, sandy shales.....	0 to 20	290	
Coal, Little Coalburg, splinty, not mined commercially in State.....	0 to 3	293	
Fire clay, impure, sandy shale, with thin coals	0 to 22	315	
Sandstone, Lower Coalburg, forms great cliffs	20 to 40	355	
Shale, sandy.....	5 to 9	364	
Coal, Buffalo Creek, multiple-bedded, hard, mined commercially in Mingo County	0 to 6	370	100'
Fire clay and shale.....	35 to 55	425	
Limestone, Buffalo Creek (Winifrede?), hard, gray, lenticular, with marine fossils, on Island Creek, Logan County, and at Rawl, Mingo County.....	0 to 2	427	
Sandstone, Upper Winifrede, massive, yellowish gray.....	20 to 30	457	
Shale	2 to 3	460	
Coal, Winifrede, multiple-bedded, hard, splinty, mined extensively in Kanawha Valley.....	1 to 10	470	100'
Fire clay, impure, and sandy shale.....	2 to 5	475	
Sandstone, Lower Winifrede, massive...	20 to 40	515	
Shale	1 to 2	517	
Coal, Chilton "A," multiple-bedded, not mined commercially in State.....	0 to 3	520	50'
Fire clay, impure, and shale.....	10 to 18	538	
Sandstone, Upper Chilton, massive, medium grained, micaceous.....	20 to 40	578	
Coal, Chilton "Rider," splinty, multiple-bedded, upper portion of seam mined extensively on Spruce Fork, Logan County	0 to 4	582	

	Thickness Feet.	Total Feet.	
Fire clay shale, probable horizon of the marine fossiliferous Winifrede Limestone of Winifrede Creek, Kanawha County	0 to 20	602	
Coal, Chilton , multiple-bedded, splinty, lower portion of bed mined extensively on Spruce Fork, and same as mined on Dingess Run and Buffalo Creek, all in Logan County.....	1 to 8	610	90
Fire clay, impure, and shale.....	0 to 5	615	
Sandstone, Lower Chilton , massive.....	0 to 30	645	
Coal, Little Chilton , double-bedded, split off seam mined on Dingess Run, and Rum Creek, Logan County.....	0 to 2	647	
Sandstone, Hernshaw , massive.....	20 to 49	696	
Coal, Hernshaw , multiple-bedded, mined on Lens Creek, Kanawha County, where it is known as "Black Band" seam	0 to 4	700	
Fire clay and sandy shales.....	1 to 5	705	
Sandstone, Naugatuck	15 to 21	726	
Coal, Dingess , multiple-bedded, gas type, once mined commercially at Dingess, and may be same as Williamson Coal of Mingo County.....	1 to 4	730	30'
Shale	1 to 5	735	
Sandstone, Williamson	5 to 20	755	
Shale	1 to 5	760	
Limestone, Dingess , gray and hard, frequently brown and silicious, lenticular, ferriferous, with marine fossils widely persistent in Kanawha, Boone, Logan and Mingo Counties.....	0 to 2	762	
Shale, dark green, sandy, with iron ore nodules and plant fossils.....	0 to 30	792	
Coal, Williamson , multiple-bedded, splinty, mined commercially at Williamson, Mingo County, and Auburn, Kentucky	1 to 8	800	70'
Fire clay, impure, and shale.....	1 to 5	805	
Sandstone, Upper Cedar Grove	10 to 40	845	
Shales, dark gray, with iron ore nodules and plant fossils, and holding the marine fossiliferous Seth Limestone of Boone County near base.....	20 to 50	895	
Coal, Cedar Grove , multiple-bedded, splinty; when normal, the base of upper bench is hard and splinty, and reverse is true of lower bench; mined extensively in Kanawha Valley; same as Island Creek seam; also the Red Jacket or Upper Thacker bed of Mingo County	2 to 5	900	100'
Fire clay and shale.....	0 to 10	910	
Sandstone, Middle Cedar Grove , frequently holding a thin coal.....	0 to 60	970	

	Thickness Feet.	Total Feet.	
Coal, Lower Cedar Grove, multiple-bedded, splinty at top, and is the lower bench of the Cedar Grove proper of Kanawha; also of the Island Creek bed of Logan; likewise the same as the Lower Thacker of Mingo County.....	2 to 5	975	75'
Fire clay, impure, and shale.....	1 to 10	985	
Sandstone, Lower Cedar Grove, massive..	20 to 30	1015	
Coal, Alma "A," not mined commercially in State.....	0 to 1	1016	
Shale, dark gray, with iron ore nodules and plant fossils.....	5 to 9	1025	
Coal, Alma, multiple-bedded, splinty layers, same as Draper seam of Logan County, mined extensively in latter and in Mingo County.....	2 to 5	1030	55'
Fire clay, impure, and shale.....	0 to 5	1035	
Sandstone, Monitor ("Logan"), massive, bluish gray, medium grained, micaceous	20 to 40	1075	
Shale, sandy.....	1 to 5	1080	
Coal, Little Alma, multiple-bedded, slaty, not mined commercially in State.....	0 to 3	1083	53'
Sandstone, Peerless, massive, micaceous..	15 to 29	1112	
Shale, sandy, gray, flaggy.....	1 to 5	1117	
Limestone, Campbell Creek, dark gray, hard, silicious, lenticular, carrying marine fossils at Kayford, Kanawha County	0 to 2	1119	
Shale, flaggy and sandy, with iron ore nodules and plant fossils.....	10 to 20	1139	
Coal, Campbell Creek, multiple-bedded, gas type, includes Peerless and No. 2 Gas seams in Kanawha Valley, and Warfield, Freeburn, Burnwell, and Upper War Eagle beds of Mingo County....	2 to 6	1145	62'
Sandstone, Brownstown, massive, bluish gray and brown, micaceous.....	25 to 51	1196	
Coal, Powellton "A," double-bedded, not mined commercially in State.....	0 to 1	1197	
Shale, sandy, flaggy and laminated.....	10 to 20	1217	
Coal, Powellton, multiple-bedded, both gas and splinty type, mined extensively in Kanawha Valley, and same as Hatfield Tunnel vein of Mingo County....	0 to 3	1220	75'
Shale, dark, laminated.....	10 to 20	1240	
Limestone, Stockton, silicious, lenticular..	0 to 4	1244	
Shales, dark, with marine fossils in southeastern Boone and northern Wyoming Counties	25 to 34	1278	
Coal, Matewan, double-bedded, soft gas type, not mined commercially in State	0 to 5	1283	63'
Sandstone, Matewan, massive.....	20 to 37	1320	
Coal, Eagle "A," soft gas type, irregular, not mined in the State.....	0 to 2	1322	39'

	Thickness		Total	
	Feet.		Feet.	
Sandstone, Eagle , massive, coarse, gray and brown.....	20 to	37	1359	
Shale, carrying marine fossils on head of Little Cub Creek, near Botsford, Wyoming County.....	5 to	10	1369	
Coal, Eagle , both gas and splint type, multiple-bedded, mined extensively in Kanawha Valley, and same as Middle War Eagle seam of Turkey Creek, Mingo County, and " Mohawk " bed of western McDowell.....	1 to	6	1375	53'
Fire clay, impure, and shale.....	0 to	5	1380	
Sandstone, Bens Creek	0 to	27	1407	
Coal, Bens Creek , multiple-bedded, soft gas, columnar type, and probably a split off the Eagle proper of the Kanawha Valley.....	0 to	3	1410	35'
Fire clay and shale.....	5 to	10	1420	
Sandstone, Decota , massive.....	40 to	57	1477	
Shale, carrying marine fossils at Oceana and northwest of Ellick, Wyoming County	5 to	10	1487	
Coal, Little Eagle , multiple-bedded, soft gas, columnar type, not mined.....	1 to	3	1490	80'
Sandstone , flaggy and shaly.....	0 to	20	1510	
Coal, Cedar , multiple-bedded, soft gas type, once mined commercially at Cedar, Mingo County, and probably a split off the Little Eagle proper of the Kanawha Valley.....	0 to	4	1514	24'
Sandstone, Grapevine , making cliffs along the N. & W. Ry. grade at mouth of Grapevine Creek, Mingo County.....	25 to	30	1544	
Shale, Eagle , dark to black, laminated with marine fossils.....	15 to	20	1564	
Limestone, Eagle , dark, brittle, hard, lenticular, with marine fossils widely persistent from the Kanawha to Tug Fork	0 to	2	1566	52'
Shale, Eagle , black, with iron ore nodules and marine fossils.....	10 to	25	1591	
Coal, Little Cedar , not mined commercially in the State.....	0 to	1	1592	26'
Sandstone, Lower War Eagle , flaggy, micaceous	20 to	30	1622	
Slate, black, with plant fossils.....	5 to	10	1632	
Coal, Lower War Eagle , multiple-bedded, soft gas type, not mined commercially in the State.....	0 to	3	1635	43'
Shale	1 to	5	1640	
Sandstone, Upper Gilbert , massive, grayish white, medium grained, making cliffs opposite Gilbert, Mingo County	40 to	50	1690	
Shale, black, laminated, silicious, with iron ore nodules, at Oceana, carrying the dark gray, silicious, lenticular Oceana Limestone —0" to 24"—near top.....	10 to	15	1705	

	Thickness Feet.	Total Feet.	
Sandstone, bluish gray to dark, laminated	10 to 15	1720	
Coal, Glenalum Tunnel, multiple-bedded, soft, gas, columnar type, much split up with partings of slate 1 to 2 feet in thickness, not mined commercially in State	0 to 15	1735	100'
Sandstone, Lower Gilbert, massive, gray- ish white, lower of twin cliffs opposite Gilbert, Mingo County.....	50 to 80	1815	
Coal, Gilbert "A," multiple-bedded, soft, gas, columnar type, observed only in southwest edge of McDowell County...	1 to 0	1815	
Shale, dark, flaggy, laminated, with marine fossils, on Clear Fork, Wyoming County	40 to 5	1820	
Coal, Gilbert, multiple-bedded, gas, soft, columnar type, not mined commer- cially	0 to 4	1824	
Shale, sandy, lenticular.....	0 to 6	1830	95'
New River Group (1300 feet).			
Sandstone, Nuttall, current-bedded, me- dium grained to coarse, frequently pebbly, making great cliffs along the N. & W. Ry. grade between War Eagle and Wyoming Station (formerly Dot- son), where it is locally known as the "Dotson"; also the same as Bear- wallow Conglomerate of the Tazewell Folio of the U. S. Geological Survey..	75 to 125	1955	
Coal, Douglas "A," soft, slaty, observed only in southern edge of McDowell County	1 to 0	1955	
Shale, sandy, lenticular.....	50 to 10	1965	
Coal, Douglas, generally single-bedded, gas, soft, columnar type, mined com- mercially at Douglas Station, McDow- ell County.....	1 to 5	1970	140'
Fire clay shale, sandy.....	0 to 5	1975	
Sandstone, Lower Nuttall, heavy to cur- rent-bedded, sometimes conglomeratic, grayish white to brown, making great vertical cliffs along banks of Clear Fork and on down Guyandot River to Justice in Wyoming County; probably a split off the Nuttall proper of the New River region of Fayette County	50 to 100	2075	
Shale, Douglas, dark, sandy, laminated, with marine fossils at base.....	5 to 15	2090	
Coal, Lower Douglas, multiple-bedded, soft, gas, columnar type, not mined commercially in the State.....	1 to 5	2095	125'
Shale, gray and sandy.....	1 to 5	2100	

	Thickness		Total	
	Feet.		Feet.	
Sandstone, Panther , massive conglomerate to heavy and current-bedded, grayish white to brown, forms cliff along N. & W. Ry. grade between Panther and Douglas Station, McDowell County, and probably upper portion of " Dismal Conglomerate ".....	40 to	50	2150	
Shale , dark and sandy.....	0 to	10	2160	
Coal, laeager "B," multiple-bedded, soft, gas, columnar type, observed only on headwaters of Panther Creek, McDowell County	3 to	0	2160	65'
Sandstone, Upper laeager , massive, medium grained, gray to brown, making cliffs, 175 feet above Tug Fork at Iaeger, McDowell County.....	30 to	50	2210	
Coal, laeager "A," slaty and sulphurous, observed only on headwaters of Panther Creek, McDowell County.....	1.6 to	0	2210	50'
Shale, Upper laeager , dark, argillaceous, laminated, with plant fossils at base..	5 to	60	2270	
Coal, laeager , generally double-bedded, soft, columnar, mined locally at Iaeger, McDowell County, 100 feet above N. & W. Ry. grade.....	2 to	5	2275	65'
Shale , sandy.....	0 to	5	2280	
Sandstone, Middle laeager , massive, grayish white, medium grained to coarse, forms cliffs at Iaeger, McDowell County	30 to	40	2320	
Coal, Lower laeager , double-bedded, soft, columnar, not mined commercially in State	0 to	2	2322	47'
Fire clay shale	0 to	3	2325	
Sandstone, Lower laeager , massive, gray and brown, medium grained, micaceous	20 to	30	2355	
Shale, Lower laeager , dark gray, argillaceous, laminated.....	20 to	35	2390	
Sandstone, Harvey Conglomerate , current-bedded, often massive and conglomeratic, medium grained to coarse, grayish white to brown, lenticular, forms great cliffs near ridge summits, $\frac{1}{2}$ mile S. W. of Pando and $\frac{3}{4}$ mile N. 60° W. of English, McDowell County.....	125 to	25	2415	
Shale, Sandy Huff , dark gray, argillaceous, laminated, cropping flush with N. & W. Ry. grade, just below mouth of Sandy Huff Branch, McDowell County	5 to	40	2455	
Coal, Castle , multiple-bedded, soft, columnar, irregular, not mined commercially	2 to	0	2455	133'
Sandstone, Guyandot , massive, current-bedded, often conglomeratic, medium grained to coarse, lenticular, grayish white, forms great cliffs in Wyoming and McDowell.....	50 to	75	2530	

	Thickness Feet.	Total Feet.	
Shale, sandy and dark.....	0 to 5	2535	
Coal, Sewell "B," multiple-bedded, soft, columnar, attains minable dimensions only in southeastern Wyoming and McDowell Counties, erroneously correlated with Iaeger bed in Volume II(A)	0 to 5	2540	85'
Shale, sandy, flaggy and laminated.....	10 to 24	2564	
Coal, Sewell "A," double-bedded, soft, columnar, not mined commercially.....	0 to 1	2565	25'
Sandstone, Lower Guyandot, massive to current-bedded, medium grained, grayish white, lenticular, forms cliffs in Wyoming and McDowell Counties...	0 to 50	2615	
Shale, dark, with plant fossils.....	0 to 5	2620	
Coal, Sewell, generally double-bedded, soft, columnar, mined commercially in Fayette and Raleigh Counties, also in McDowell, where it is known as the "Davy" bed.....	0 to 5	2625	60'
Shale, gray, sandy, lenticular.....	40 to 5	2630	
Sandstone, Welch, massive to current-bedded, grayish white, lenticular, forms great cliffs along Tug Fork between Welch and Roderfield, and on Dry Fork near Bradshaw.....	0 to 55	2685	
Shale, dark, argillaceous, lenticular.....	0 to 5	2690	
Coal, Welch, multiple-bedded, soft, columnar, mined commercially at Hemphill, Premier, Coalwood, 1 mile east of Ritter, and 1.5 miles S. E. of Beartown, McDowell County.....	0 to 5	2695	70'
Shale, gray, sandy.....	0 to 5	2700	
Sandstone, Upper Raleigh, heavy to current-bedded, often conglomeratic, grayish white to brown, forms great cliffs in Fayette, Raleigh, Wyoming and McDowell Counties.....	75 to 103	2803	
Coal, Little Raleigh, multiple-bedded, soft, columnar, known as "Snake Root" bed in McDowell County, not mined in State	0 to 2	2805	110'
Shale, sandy, lenticular.....	15 to 5	2810	
Sandstone, Lower Raleigh, massive to current-bedded, lenticular, prominent cliff maker in Raleigh County.....	0 to 60	2870	
Shale, dark gray, argillaceous, lenticular..	0 to 9	2879	
Coal, Beckley, multiple-bedded, soft, columnar, mined commercially in Raleigh and McDowell Counties, same as "War Creek" bed of latter area.....	0 to 6	2885	80'
Sandstone, Quinnimont, lenticular.....	0 to 40	2925	
Shale, Quinnimont, dark gray, silicious and argillaceous, laminated, lenticular	0 to 45	2970	

	Thickness Feet.	Total Feet.	
Coal, Fire Creek , multiple-bedded, soft, columnar, mined commercially in Fayette and Raleigh Counties, same as the locally known " Lower Beckley " at Slab Fork, latter county.....	0 to 5	2975	90'
Shale , sandy, with sandstone layers.....	10 to 28	3003	
Coal, Little Fire Creek , multiple-bedded, soft, columnar, not mined commercially in State.....	0 to 2	3005	30'
Sandstone, Pineville , massive to current-bedded, forming sheer cliff almost 100 feet high on Guyandot River at Pineville, Wyoming County.....	50 to 85	3090	
Shale , sandy.....	0 to 5	3095	
Coal, No. 9 Pocahontas , multiple-bedded, soft, columnar, not mined commercially in State.....	0 to 5	3100	95'
Shale and sandstone mixed	0 to 28	3128	
Coal, No. 8 Pocahontas , impure, soft, columnar, not mined commercially in State	0 to 2	3130	30'
Pocahontas Group (720 feet).			
Sandstone, Flattop , massive to current-bedded, medium grained, micaceous, bluish gray to brown, capping ridge summit of Flattop Mountain at Coal-dale, Mercer County.....	20 to 50	3180	
Shale, Rift , dark gray, with argillaceous and silicious layers, cropping in bed of Big Creek at Rift, McDowell County	30 to 17	3197	
Coal, No. 7 Pocahontas , multiple-bedded, soft, columnar, not mined commercially in State.....	0 to 3	3200	70'
Shale , gray and sandy.....	0 to 5	3205	
Sandstone, Pierpont , heavy to current-bedded, medium grained, hard, micaceous, bluish gray to light gray, making great cliff flush with Virginian Ry. grade $\frac{1}{4}$ mile southeast of Pierpont, Wyoming County.....	40 to 60	3265	
Shales , sandy, and sandstone, alternating	0 to 35	3300	
Shale , buff, sandy, with marine fossils in Raleigh and Mercer Counties.....	0 to 5	3305	
Coal, No. 6 Pocahontas , multiple-bedded, soft, columnar, mined commercially in Mercer County.....	0 to 5	3310	110'
Shale , sandy.....	0 to 5	3315	
Sandstone, Eckman , massive to current-bedded, medium grained, buff to bluish gray, once quarried in hill due east of Eckman, McDowell County, often cuts out the No. 5 and No. 4 Pocahontas Coals.....	40 to 67	3382	
Coal, No. 5 Pocahontas , multiple-bedded, soft, columnar, not mined commercially in State.....	0 to 5	3387	77'

	Thickness Feet.	Total Feet.	
Shale, sandstone and dark shale, with plant fossils abundant.....	0 to 20	3407	
Coal, No. 4 Pocahontas , multiple-bedded, soft, columnar, mined commercially on Elkhorn Creek and Tug Fork, Mc- Dowell County.....	0 to 8	3415	28'
Shale, sandy.....	0 to 5	3420	
Sandstone, Upper Pocahontas , massive to heavy-bedded, medium grained to coarse, quarried at Pocahontas, Vir- ginia	25 to 55	3475	
Coal, No. 3 Pocahontas "Rider," not mined	2 to 0	3475	
Shale, dark, with plant fossils abundant, and marine fossils reported on Piney in Raleigh County.....	0 to 10	3485	
Coal, No. 3 Pocahontas , multiple-bedded, soft, columnar, mined extensively in Wyoming, McDowell, and Mercer Counties	0 to 15	3500	85'
Shale, gray and sandy.....	0 to 10	3510	
Sandstone, Lower Pocahontas , generally massive, medium grained, when shaly often carries 18" to 24" of slaty coal (No. 2 "A" Pocahontas) near middle	0 to 50	3560	
Shale, gray and sandy.....	0 to 8	3568	
Coal, No. 2 Pocahontas , multiple-bedded, soft, columnar, not mined in State...	0 to 2	3570	70'
Shale, gray.....	0 to 5	3575	
Sandstone, Vivian , massive, bluish gray, medium grained, lenticular, quarried at East Vivian, McDowell County....	0 to 29	3604	
Coal, No. 1 Pocahontas , generally single- bedded, soft, columnar, not mined in State	0 to 1	3605	35'
Sandstone, Landgraff , massive, buff, me- dium grained, micaceous, quarried at Landgraff, McDowell County.....	0 to 20	3625	
Coal, Landgraff , soft, columnar.....	0 to 1	3626	21'
Sandstone, Keystone , massive, buff, me- dium grained, micaceous, making cliff 8 to 10 feet above N. & W. Ry. grade at Keystone Station, McDowell County	0 to 23	3649	
Coal, Keystone , impure, cropping at Key- stone Station.....	0 to 1	3650	24'
Shale and sandstone.....	10 to 15	3665	
Shale, North Fork , black, with thin lenses —1" to 2"—of iron ore and marine fos- sils, crops flush with N. & W. Ry. grade at North Fork Station, Mc- Dowell County.....	5 to 10	3675	
Coal, Simmons , soft, columnar, cropping in public road just northwest of Sim- mons Station, Mercer County.....	0 to 1	3676	26'
Shale and sandstone, alternating.....	0 to 122	3798	

	Thickness		Total	
	Feet.		Feet.	
Coal, Squire Jim, multiple-bedded, soft, columnar, observed only in southeastern McDowell County, near Squire Jim P. O.....	0 to	2	3800	124'
Shale and sandstone to top of the Mississippian Rocks, or Red Shale of Mauch Chunk	0 to	50	3850	50'

The great thickness (3850 feet) of Pottsville rocks in the territory of this Report, as revealed in the above general section, is in marked contrast to that—250 to 350 feet—in the northern edge of the State. The rapid expansion of these beds both southwestward and southeastward from the Kanawha River has made it a very difficult matter to correlate accurately the several contained coals as also the many sandstones and marine fossil horizons. This difficulty is further enhanced by the fact that the intermediate region, between the latter river and the Kentucky and Virginia border along the waters of Tug Fork, is largely forested. Hence, the foregoing section is subject to revision in minor details as regards the smaller and undeveloped coal beds. This is specially true in that portion of the rock column intervening between the Beckley and No. 3 Pocahontas seams, where deposition was very irregular even for the Pottsville Measures.

Several measured sections, determined from crop exposures, frequently supplemented with the logs of coal test borings, and grouped by counties and magisterial districts, will now be given on the following pages of this Chapter:

WYOMING COUNTY SECTIONS.

Oceana District.

Oceana District lies in the northern point of Wyoming County and consequently the rocks of the Kanawha Group cover about 85 per cent. of its surface, the other 15 per cent. being occupied by the New River Measures. As mentioned at the beginning of this Chapter, there are a few isolated areas of the Allegheny along the high ridge on the north border, but these will barely exceed one square mile in extent. Within

this district, the first mentioned series is slightly less in total thickness than in western McDowell County, where they attain the maximum development observed in the State.

The following section was measured with aneroid by Hennen southward from the summit of the hill, $\frac{1}{2}$ mile north-west of Oceana, to the bed of Clear Fork:

Oceana Section, Oceana District.

Pennsylvanian (742')		Thickness	Total	
Kanawha Group (730')		Feet.	Feet.	
Sandstone, Logan , massive, grayish brown, medium grained, micaceous.....		45	45	
Concealed in steep slope.....		15	60	
Concealed in bench		5	65	
Sandstone, Brownstown , massive, cliff rock.		60	125	
Concealed in steep slope.....		20	145	
Concealed along bench.....		5	150	
Shale		5	155	
Sandstone, flaggy at bottom, massive at top, medium grained, brownish-gray.....		30	185	
Concealed		5	190	
Sandstone, flaggy bottom, shaly middle, flaggy top.....		60	250	
Concealed, mostly buff sandy shale.....		50	300	
Shale		10	310	
Slate .....0' 3" }	Eagle (1685' B.)	2	312	312'
Coal, gas.....1 9 }				
Shale		3	315	
Sandstone, Decota		50	365	
Concealed		14	379	
Coal, Little Eagle , at old opening fallen shut, but reported 42" thick (1615' B.).....		3	382	70'
Concealed, mostly brown shale with sandstone at top.....		68	450	
Shale		5	455	
Sandstone, making cliff, medium grained, gray, micaceous, flaggy, Grapevine		35	490	
Concealed		100	590	
Limestone, gray, hard, silicious, Oceana		2	592	
Shale and concealed.....		37.5	629.5	
Coal opening (2' 6"), Glenalum Tunnel (1365' B.).....		2.5	632	250'
Sandstone, massive top, flaggy bottom, fine grained, micaceous, gray and brown, Lower Gilbert		45	677	
Concealed		8	685	
Shale, sandy, flaggy, laminated, dark.....		45	730	
Coal blossom, Gilbert		0	730	98'
New River Group (12')				
Sandstone, massive, brown, micaceous, medium grained, Nuttall , to bed of Clear Fork at west edge of Oceana.....		12	742	

The foregoing section reveals the true position of the **Oceana Limestone** at its type locality, this being a new member introduced into the Kanawha Group. It also shows the Middle Pottsville or New River Group just emerging above drainage on the rapid southeast rise of the strata. The latter feature causes both thicknesses and intervals to be slightly less than they should. That the coal at 310 feet from the top certainly represents the Little Eagle bed is evidenced by the following carefully measured aneroid section by the writer eastward down the west hillside of Laurel Fork to the bed of the latter stream, $\frac{1}{2}$ mile southward from its mouth, which reveals the marine fossiliferous Eagle Shale at its proper interval below what is the same bed as once mined locally at Oceana:

Section 1.3 Miles S. E. of Oceana, Oceana District.

Pennsylvanian (815')		Thickness	Total
Kanawha Group (665')		Feet.	Feet
Unrecorded, mostly concealed from summit of knob.....	250	250	
Bench (horizon of Eagle Coal) (1855' B.)...	0	250	250'
Concealed in steep slope, mostly sandstone	71	321	
Coal, Little Eagle, in digging, reported 4' 0" (1780' B.).....	4	325	75'
Concealed and black slate, Eagle, with marine fossils.....	43	368	
Coal, Little Cedar, in digging fallen shut (25")	2	370	45'
Concealed	85	455	
Sandstone, massive, medium grained, brown	5.5	460.5	
Shale, dark.....	1.5	462	
Concealed	3	465	
Coal opening, closed, Lower War Eagle.....	0	465	95'
Concealed	122	587	
Coal, Glenalum Tunnel, opening closed, reported	3	590	125'
Concealed	35	625	
Sandstone, massive, Lower Gilbert	30	655	
Slate, black.....	6.5	661.5	
Coal, gas, medium hard 0' 10" } Slate, bluish gray.....1 3 } Gilbert, 3' 6" (1435' B.) Coal, gas, medium hard 1 5 }	3.5	665	75
New River Group (150')			
Slate and concealed, mostly sandstone, Nuttall	120	785	
Sandstone, Lower Nuttall , current-bedded, to Laurel Fork.....	30	815	

The following section was measured with aneroid by the writer just across the line in the edge of Raleigh County from the extreme eastern point of Oceana District, eastward along the hill road from the summit at Clear Fork Gap. The intervals are slightly greater than they should be owing to the dip of the measures in this direction down the nose of the Pineville Anticline. Two marine fossil horizons are noted; viz, the Eagle Shale or Limestone, and the roof shales of the Gilbert Coal:

Clear Fork Gap Section, Trap Hill District, Raleigh County.

Pennsylvanian (810')		Thickness Total	
Kanawha Group (515')		Feet.	Feet.
Sandstone, hard, at road summit of Clear Fork Gap.....	25	25	
Concealed	10	35	
Coal opening, Matewan.....	5	40	40'
Shale and shaly slate.....	15	55	
Concealed	10	65	
Shale	11	76	
Coal, gas, soft, slaty top 2' 3" }			
Shale .....1 4 } Eagle, 8' 7" ..	9	85	45'
Coal, reported.....5 0 } (2730' B.)			
Shale	2	87	
Sandstone, Decota, light gray, massive.....	40	127	
Shale	13	140	
Concealed	10	150	
Shale, sandy, buff.....	10	160	
Shale, black, sandy.....	11	171	
Shale, black, sandy, with many marine fossils in top portion, Eagle.....	14	185	100'
Sandstone, massive.....	5	190	
Shale, dark, sandy.....	15	205	
Sandstone, massive, Lower War Eagle.....	50	255	
Concealed	10	265	80'
Shale, sandy, dark.....	15	280	
Sandstone, flaggy, and shaly.....	15	295	
Shale, sandy, brown.....	10	305	
Concealed	5	310	
Shale, dark, sandy, with fossil plants.....	11	321	
Coal, gas, soft.....0' 9" }			
Slate, black.....0 1 } Lower War Eagle 3' 10"	4	325	60'
Coal, gas, soft.....3 0 } (2490' B.)			
Fire clay and shale.....	5	330	
Sandstone, soft, brown.....	15	345	
Coal, reported.....	0	345	20'
Sandstone, soft, brown.....	15	360	
Concealed	15	375	
Coal blossom, heavy, Glenalum Tunnel, Upper Bench.....	0	375	30'
Shale	5	380	

	Thickness Total		
	Feet.	Feet.	
Coal, slaty (0' 5").....	0	380	
Shale, gray.....	3	383	
Coal, soft.....0' 2½" } Glenalum Tunnel			
Shale, gray.....0 3 } (Lower Bench)..	2	385	10'
Coal, gas, soft.1 3½ } 1' 9"			
Shale	2	387	
Sandstone, massive, brown, soft, friable, upper half softer than lower half, Lower Gilbert	53	440	
Shale, sandy, marine fossils....30' } Gilbert.	40	480	
Slate, black, marine fossils....10 }			
Shale, brown, sandy.....	15	495	
Coal, 0' 1", (Gilbert "A").....	0	495	110'
Slate, black.....	10	505	
Concealed, probable horizon of Gilbert Coal	10	515	
New River Group (295')			
Sandstone, massive, brown, soft, Nuttall...	30	545	
Shale, buff, sandy.....	10	555	
Concealed	10	565	
Shale, buff, sandy.....	13.5	578.5	
Coal, gas, soft, Douglas, 1' 7".....	1.5	580	85'
Shale, gray.....	5	585	
Concealed	5	590	
Sandstone, massive, soft, brown, rotten...	25	615	
Coal, 0' 5".....	0	615	35'
Fire clay shale.....	3	618	
Concealed	12	630	
Sandstone, friable, brown.....	15	645	
Shale, dark, sandy.....	15	660	
Concealed	15	675	
Sandstone, brown and reddish, soft, rotten..	50	725	
Concealed, mostly shale.....	20	745	
Shale, white and brown, sandy.....	35	780	
Sandstone, flaggy.....	15	795	
Shale, dark, flaggy, sandy.....	5	800	
Concealed to foot of hill.....	10	810	

Clear Fork District.

Clear Fork District, lying immediately southwest from Oceana District and along the western margin of Wyoming County, is in the region of the outcropping rocks of the Kanawha and New River Groups exclusively, except a few acres of the Allegheny capping the summit of "Burning Rock" Knob in its northeastern edge. The first mentioned group occupies 45 square miles of the total area—53 square miles—the other 8 being covered by the New River Group. The following section was measured near the center of the district

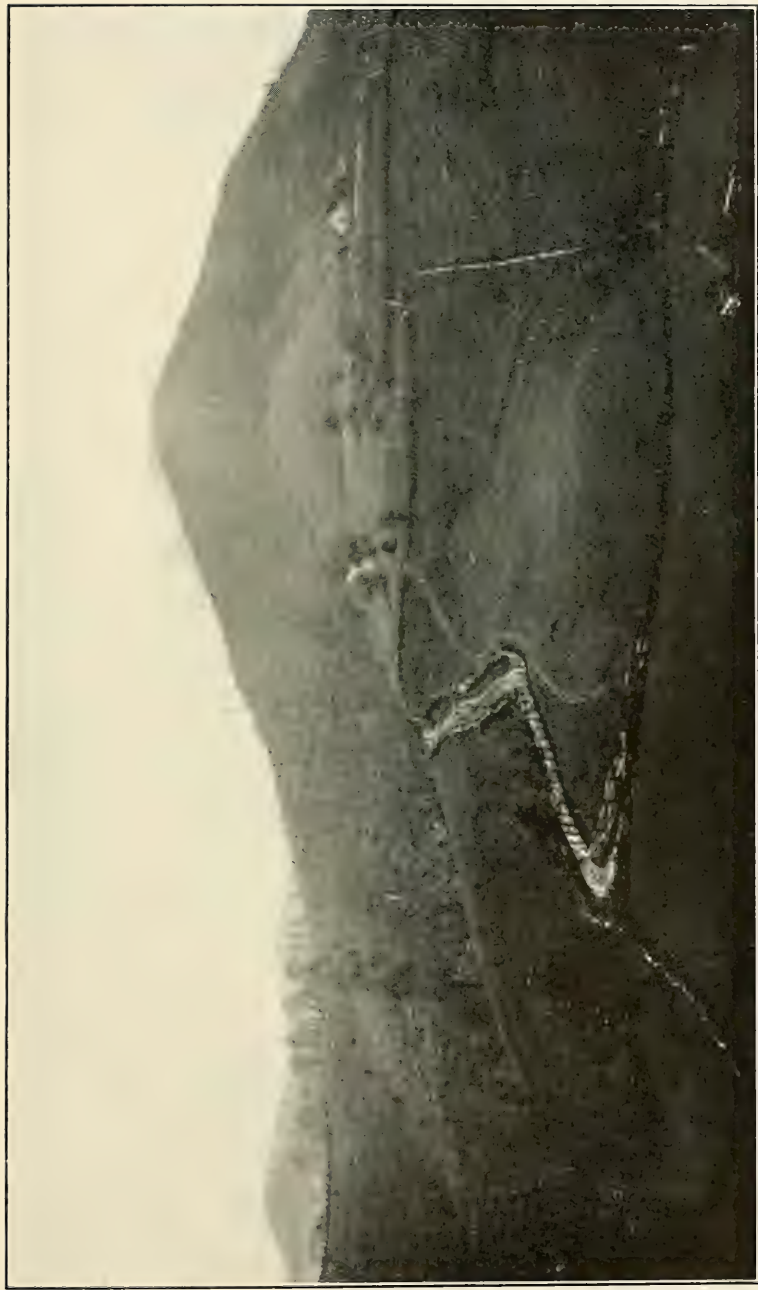


PLATE V—Showing Pilot Knob in southeastern Wyoming County and topography of the New River Group, looking southwest; summit of knob, 3270 feet above sea level.

with aneroid by Hennen eastward from the ridge summit on the head of Tantrough Hollow to the bed of Cedar Creek near the residence of Lee C. Harvey:

Cedar Creek Section, Clear Fork District.

Pennsylvanian (720')	Thickness	Total	
Kanawha Group (720')	Feet.	Feet.	
Sandstone, capping knob, Lower Chilton	35	35	
Concealed	10	45	
Sandstone, flaggy.....	10	55	
Concealed	20	75	
Sandstone, flaggy.....	15	90	
Concealed	35	125	
Coal blossom, Hernshaw (2210' B.).....	0	125	125'
Concealed in steep bluff.....	70	195	
Concealed in bench.....	5	200	
Concealed	58	258	
Sandstone, massive, light brown, micaceous, medium grained.....	10	268	
Shale, buff.....	2	270	
Coal, gas, medium soft .....3' 6" } Cedar Grove			
Shale, gray, soft, 1' 3" to.....1 6 } (2055' B.).....	10	280	155'
Coal, gas.....5 0 } (Reported by L. C. Harvey)			
Concealed	25	305	
Sandstone, massive.....	5	310	
Concealed	10	320	
Coal blossom, Lower Cedar Grove	0	320	40'
Concealed	35	355	
Coal blossom, Alma	0	355	75'
Concealed	75	430	
Coal opening, closed, (reported 4' to 5' thick) Campbell Creek (No. 2 Gas)	5	435	80'
Concealed	195	630	
Sandstone, massive, and concealed.....	90	720	
Coal blossom, Eagle (1615' B.).....	0	720	285'

Baileysville District.

Baileysville District lies immediately east of Clear Fork District, so that slightly less than one-third of its area is included in the outcropping strata of the Kanawha Group, the remainder being in the New River Measures. The following section was measured with aneroid by the writer southwestward nearly along the strike of the rocks from the summit of a high knob down to the bed of Guyandot River near the ford across the latter at Baileysville:

Baileysville Section, Baileysville District.

Pennsylvanian (780')	Thickness	Total	
Kanawha Group (300')	Feet.	Feet.	
Shale, brown, sandy, capping knob north-east of Baileysville.....	5	5	
Concealed, mostly shale.....	65	70	
Concealed, and shale, in Bench (Lower War Eagle Coal horizon)	10	80	80'
Sandstone, massive, greenish brown, Upper Gilbert	55	135	
Concealed, mostly shale.....	70	205	
Concealed, steep slope, mostly brown sandy shale	90	295	
Concealed in bench, probably Gilbert Coal horizon	5	300	220'
New River Group (480')			
Concealed, steep slope.....	120	420	
Shale, sandy, bluish gray, flaggy.....	12	432	
Coal, gas.....0' 4 "			
Slate .....0 0$\frac{1}{8}$			
Coal, gas, hard.0 4	Douglas 4' 0".....	4	436
Coal .....2 0	(1490' B.)		136'
Slate, black...0 0$\frac{1}{8}$			
Coal, gas.....1 3$\frac{3}{4}$			
Slate and concealed.....	19	455	
Sandstone, massive.....	15	470	
Shale, dark.....	4	474	
Coal, 1' 2", local.....	1	475	39'
Shale, sandy, dark.....	20	495	
Concealed	5	500	
Shale	9	509	
Sandstone, fine grained, micaceous, massive	6	515	
Shale, sandy, dark.....	15	530	
Concealed	10	540	
Sandstone, massive.....	25	565	
Concealed	50	615	
Concealed in steep bluff formed by Upper laeger Sandstone	55	670	
Concealed in bench.....	10	680	
Concealed in steep slope.....	35	715	
Sandstone, flaggy and shaly.....	25	740	
Concealed	20	760	
Shale, dark, flaggy and sandy.....	15	775	
Sandstone, gray, white, hard, Guyandot	5	780	

Slab Fork District.

Slab Fork District, lying in the northeast edge of Wyoming along the border of Raleigh County, is in a region where all three divisions of the Pottsville Measures crop to the surface. The Kanawha Group, confined to the ridges in the northwest portion of the district, covers about 10 square

miles of the latter's surface, while the New River Measures include an area more than six times as great, and extend throughout the district. The Pocahontas Group is confined to the valleys in the southeastern portion of Slab Fork, and is about equal in areal extent to the New River. The following section was measured with aneroid by Gawthrop southward along the hill road from the summit of Cabin Ridge down to Guyandot River, $\frac{1}{2}$ mile west of the mouth of Still Run. The intervals are slightly less than they should be, owing to the rapid rise of the strata in this direction:

Cabin Creek Ridge Section, Slab Fork District.

Pennsylvanian (840')	Thickness	Total	
New River Group (510')	Feet.	Feet.	
Concealed	40	40	
Sandstone, shaly	5	45	
Concealed	90	135	
Sandstone	5	140	
Concealed	10	150	
Sandstone, gray, medium hard	5	155	
Concealed	15	170	
Sandstone, massive, gray, micaceous	30	200	
Concealed, mostly sandstone	30	230	
Sandstone, massive, hard, medium grained micaceous, grayish-brown	10	240	
Coal streak, 0' 2"	0	240	240'
Sandstone, massive, hard, grayish-brown	5	245	
Coal, 0' 1"	0	245	
Sandstone, hard	5	250	
Coal, soft, 0' 8", (1960' B.)	0	250	10'
Sandstone, massive, hard, grayish-brown, medium grained, micaceous	15	265	
Concealed	5	270	
Sandstone, massive, broken	35	305	
Concealed	160	465	
Sandstone	5	470	
Concealed, with sandstone	40	510	
Pocahontas Group (330')			
Concealed, with sandstone	65	575	
Sandstone	15	590	
Concealed	10	600	
Shale, gray	10	610	
Concealed, mostly shale	29	639	
Coal, prospect closed, 1' 6" visible, No. 6 Pocahontas	1	640	390'
Shale and concealed	5	645	
Sandstone, massive, gray	7	652	
Concealed	3	655	
Sandstone, massive, gray, medium hard	10	665	
Concealed, sandstone and concealed	73	738	

	Thickness Feet.	Total Feet.	
Coal blossom, 1' 6" visible, No. 4 Pocahontas			
(1470' B.).....	2	740	100'
Concealed	3	743	
Sandstone	2	745	
Concealed to Guyandot River.....	95	840	

The following section was measured with aneroid by Gawthrop in the northwest central portion of Slab Fork District northwestward down Lick Branch of Milam Fork. It shows the succession in this region immediately above the great Guyandot Sandstone, as the section ends at base with the top of the latter member:

Section 2 Miles North of Saulsville, Slab Fork District.

Pennsylvanian (565')	Thickness Feet.	Total Feet.	
New River Group (565')			
Concealed	52	52	
Shale, gray.....	5	57	
Coal, gas.....0' 4" }			
Shale, gray.....0 4 }			
Coal, gas, columnar....0 9 }	3	60	60'
Coal, hard, bony.....0 3 }			
Coal, gas, columnar....1 0 }			
Shale, gray.....	1	61	
Sandstone, massive.....	4	65	
Concealed	145	210	
Sandstone, massive.....	15	225	
Concealed, with sandstone.....	35	260	
Sandstone, massive.....	10	270	
Concealed	40	310	
Sandstone, massive.....	25	335	
Concealed	95	430	
Shale, gray, silicious.....	3	433	
Coal .....0' 2" }			
Shale, gray.....5 0 }	7	440	380'
Coal, gas, columnar.1 2 }			
Concealed, shale and sandstone.....	10	450	
Concealed	70	520	
Sandstone, flaggy.....	5	525	
Concealed	21	546	
Shale, gray.....	3	549	
Coal, gas, medium hard, 0' 11", Castle			
(1820' B.).....	1	550	110'
Shale and concealed to mouth of Lick Branch	15	565	

The following is obtained in the eastern portion of the same district by combining an aneroid section measured by the writer down the east hillside of Marsh Fork with the log of Coal Test Boring No. 12 on Map II, sunk by the Western

Pocahontas Coal & Lumber Co., the details of which were furnished by Mr. H. N. Eavenson, of Gary, W. Va., and permission to publish kindly given the Survey by President George W. Stevens, of the Chesapeake & Ohio Railway Company:

Maben Section, Slab Fork District.

Pennsylvanian (1026.5')	Thickness	Total	
New River Group (810')	Ft. In.	Ft. In.	
Sandstone, gray, brown, and hard, Upper laeger? , from summit of knob $\frac{3}{4}$ mile northwest of Maben.....	45 0	45 0	
Concealed	40 0	85 0	
Sandstone	30 0	115 0	
Concealed	30 0	145 0	
Sandstone, flaggy at base.....	35 0	180 0	
Concealed, with sandstone and shale..	120 0	300 0	
Concealed along bench (Sewell Coal horizon)	5 0	305 0	305'
Concealed, mostly sandstone.....	45 0	350 0	
Sandstone, Welch	10 0	360 0	
Concealed	60 0	420 0	
Sandstone, grayish white, Upper Raleigh , and concealed, mostly.....	100 0	520 0	
Concealed along bench	15 0	535 0	
Sandstone, grayish white, hard, Lower Raleigh , to top of boring.....	50 0	585 0	280'
Continued in Western Pocahontas Coal and Lumber Co. Core Test No. 3 (No. 12 on Map II), (elevation, 1683' L.):			
Sand and boulders.....	9 0	594 0	
Sandstone, Quinnimont	34 0	628 0	
Slate, sandy, Quinnimont	19 8	647 8	
Coal, Fire Creek (1619' L.)	1 11	649 7	64' 7"
Slate, sandy.....	4 5	654 0	
Sandstone, slaty.....	6 0	660 0	
Sandstone	5 0	665 0	
Sandstone, very hard.....	26 0	691 0	
Slate	42 4	733 4	
Coal	0 4	733 8	84' 1"
Slate	10 4	744 0	
Sandstone, hard, Pineville	26 0	770 0	
Slate	4 8	774 8	
Coal, slaty, No. 9 Pocahontas	0 6	775 2	41' 6"
Slate	3 10	779 0	
Sandstone, slaty.....	11 0	790 0	
Sandstone	14 0	804 0	
Slate	2 0	806 0	
Slate, sandy.....	4 0	810 0	
Pocahontas Group (216.5')			
Sandstone, slaty.....	8 0	818 0	
Slate, sandy.....	13 5	831 5	

	Thickness	Total	
	Ft. In.	Ft. In.	
Slate	23 0	91 0	
Slate, sandy	4 0	95 0	
Sandstone (Lower Guyandot)	34 0	129 0	
Slate, sandy	19 0	148 0	
Slate	1 9	149 9	
Coal, Sewell (1998.2' L.)	2 1	151 10	43' 10"
Slate	2 0	153 10	
Sandstone .....70' 2" } Upper			
Sandstone, hard, broken 16 0 } Raleigh	88 2	242 0	
Sandstone, hard..... 2 0 }			
Sandstone, slaty	18 3	260 3	
Coal, Little Raleigh (1889.0' L.)	0 9	261 0	
Slate	1 0	262 0	
Slate, sandy	6 0	268 0	
Sandstone	16 0	284 0	
Coal, Little Raleigh (1864.2' L.)	1 9	285 9	
Slate	1 3	287 0	
Sandstone .....13' 0" }			
Sandstone, slaty...21 0 }			
Slate, sandy.....49 0 }			
Slate .....23 0 } (Lower			
Sandstone 9 0 } Raleigh)..	117 6	404 6	
Sandstone, hard, broken 2 0 }			
Sandstone, hard.... 0 6 }			
Slate	5 6	410 0	
Sandstone	6 0	416 0	
Slate, sandy	1 0	417 0	
Sandstone, Quinnimont	65 0	482 0	
Slate	7 0	489 0	
Coal, slaty.... 0' 3" } Fire Creek			
Coal 2 6 } (1658.2' L.)	2 9	491 9	339' 11"
Slate	9 3	501 0	
Slate, sandy	5 5	506 5	
Sandstone	30 7	537 0	
Sandstone, slaty	20 0	557 0	
Slate, sandy	0 9	557 9	
Coal, Little Fire Creek (1591.9' L.)	0 4	558 1	66' 4"
Slate, soft	0 11	559 0	
Sandstone	27 6	586 6	
Slate, sandy	1 6	588 0	
Slate	2 0	590 0	
Sandstone, slaty	2 0	592 0	
Sandstone	14 8	606 8	
Slate, sandy	11 10	618 6	
Slate	13 10	632 4	
Coal 0' 2" } (Pocahontas No. 9)			
Slate 2 2 } (1515.2' L.)	2 6	634 10	76' 9"
Coal 0 2 }			
Slate	17 2	652 0	
Slate, sandy	14 0	666 0	
Slate	2 0	668 0	33' 2"
Pocahontas Group (254' 9")			
Sandstone (Flatop Mountain)	17 9	685 9	
Coal, Pocahontas No. 7 (1462.0' L.)	2 3	688 0	
Slate	1 0	689 0	
Sandstone (Pierpont)	60 0	749 0	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Slate, sandy	10	0	759	0	
Slate	0	8	759	8	
Coal 1' 10" } Pocahontas No.					
Coal, slaty .. 0 1 } 6 (1388.5' L.)	1	11	761	7	93' 7"
Slate	7	5	769	0	
Sandstone (Eckman and Upper Pocahontas)	121	0	890	0	
Coal 2' 8" } Pocahontas No. 3					
Slate 0 8 } (1256.1' L.)	3	11	893	11	132' 4"
Coal 0 7 }					
Slate	11	1	905	0	
Slate, sandy	4	0	909	0	
Slate	3	0	912	0	
Coal (No. 2 "A" Pocahontas)	1	1	913	1	
Slate	9	5	922	6	
Slaty coal to bottom	0	3	922	9	28' 10"

In the eastern edge of Slab Fork District, the following succession is obtained by combining a carefully measured spirit-level section with the log of a diamond drill boring (14). The latter is located on the west bank of Left Fork of Allen Creek, $2\frac{1}{2}$ miles due east of Pierpont, and it was drilled for the Western Pocahontas Coal and Lumber Company under the direction of J. C. Rawn, Chief Engineer, Pocahontas Coal & Coke Company, with Thos. H. Clagett, Assistant Engineer, in charge, who are authority for both the section and well record, and for permission to publish this record, the Survey is indebted to the courtesy of George W. Stevens, President of the Chesapeake & Ohio Railway Company. The correlations in parentheses are by the writer:

Left Fork of Allen Creek Section, Slab Fork District.

Pennsylvanian (816')	Thickness		Total		
	Ft.	In.	Ft.	In.	
New River Group (354' 6")					
Unrecorded from top of mountain....	10	0	10	0	
Coal (Welch)	1	7	11	7	11' 7"
Unrecorded	150	0	161	7	
Coal (Beckley)	0	11	162	6	
Unrecorded and slate	15	3½	177	9½	
Coal and slate 0' 4 " }					
Coal 1 1 } (Fire Creek)					
Slate 0 0½ } (2035' L.)	3	9½	181	7	170' 0"
Coal 2 4 }					
Fire clay and unrecorded	138	0	319	7	
Coal (No. 9 Pocahontas)	1	2	320	9	138' 2"
Unrecorded and slate	31	0	351	9	

	Thickness Ft. In.	Total Ft. In.	
Coal 0' 10" } (No. 8 Poca-			
Fire clay 1 5 } hontas)	2 9	354 6	33' 9"
Coal 0 3 }			
Slate 0 1 }			
Coal and slate..... 0 2 }			
Pocahontas Group (407' 6")			
Slate and unrecorded	48 0	402 6	
Coal 0' 10" } (No. 7 Poca-			
Coal 0 3 } hontas).....	1 8	404 2	49' 8"
Slate 0 5 }			
Coal and slate 0 2 }			
Unrecorded and slate.....	70 0	474 2	
Coal 0' 9 " }			
Slate 0 0 1/4 }			
Coal 0 0 1/2 }			
Slate 0 0 1/4 }			
Coal 1 1 }			
Bone 0 6 }			
Coal 0 1 }			
Slate and unrecorded to top of Core			
Test No. 1 (No. 14 on Map II), at			
elevation of 1730' L.....	9 4	486 0	9' 4"
Clay and gravel.....	5 0	491 0	
Sandstone 16' 0" } (Eckman			
Slate 1 6 }			
Sandstone, broken. 14 6 }	33 0	524 0	
Slate, sandy. 1 0 }			
Slate 4 5		528 5	
Coal, slaty, (No. 4 Pocahontas).....	0 6	528 11	42' 11"
Sandstone, (Upper Pocahontas).....	64 3	593 2	
Coal, No. 3 Pocahontas, 1619.25' L....	3 7	596 9	67' 10"
Slate, sandy.....	19 3	616 0	
Sandstone	4 4	620 4	
Sandstone, slaty.....	5 4	625 8	
Coal 0' 8" } (No. 2 "A" Poca-			
Coal, slaty.. 0 2 }	0 10	626 6	29' 9"
Slate, sandy.....	6 6	633 0	
Sandstone	5 0	638 0	
Slate 1 11		639 11	
Coal, (No. 2 Pocahontas).....	1 2	641 1	14' 7"
Slate, sandy.....	9 11	651 0	
Slate 1 0		652 0	
Sandstone 19' 0" } (Vivian			
Sandstone, broken.. 19 0 }	43 0	695 0	
Sandstone 5 0 }			
Slate, sandy.....	6 0	701 0	
Sandstone, slaty.....	4 0	705 0	
Slate, sandy.....	6 0	711 0	
Sandstone, slaty.....	10 0	721 0	
Slate, sandy.....	13 6	734 6	
Coal, (Simmons?).....	1 0	735 6	94' 5"
Slate	6 6	742 0	
Sandstone	15 0	757 0	
Slate	1 0	758 0	
Sandstone	3 0	761 0	
Sandstone, slaty.....	1 0	762 0	26' 6"

Mississippian (54')	Thickness	Total	
Mauch Chunk Series (54')	Ft. In.	Ft. In.	
Shale, green.....	13 0	775 0	
Shale, red.....	3 0	778 0	
Shale, green and red.....	5 0	783 0	
Sandstone	4 0	787 0	
Shale, red and blue.....	13 0	800 0	
Shale, red and green.....	7 0	807 0	
Shale, red.....	8 0	815 0	
Sandstone, to bottom.....	1 0	816 0	54' 0"

The above section is important in that the true position of the No. 4 Pocahontas Coal in this locality is shown to be slightly less than 65 feet above the No. 3 Pocahontas seam, instead of 120 to 130 feet above, as often assigned for this bed by local engineers. It also shows that the famous Pocahontas Coal No. 3 has a good commercial thickness (3' 7") in this region.

Center District.

Center, lying immediately southwest of Slab Fork District in the southern central portion of Wyoming, is in the region of the outcropping rocks of the New River and Pocahontas Groups, the Kanawha Measures being represented by only a few isolated patches capping the high knobs along the northwest edge of the district. The following succession is obtained in its eastern edge from combining a section measured by the writer with aneroid southward from the summit of a high knob with the log of a diamond drill boring, the latter being located on the waters of Sugar Run, 2.2 miles due east of Pineville. With the exception of the changes and additions in parentheses, the record of the boring is as published on pages 86-87 of Volume II(A) in 1908:

Pineville-Sugar Run Section, Center District.

Pennsylvanian (1131' 4")	Thickness	Total	
New River Group (842' 8")	Ft. In.	Ft. In.	
Concealed, mostly brown shale from top of knob.....	30 0	30 0	
Sandstone, soft, fine grained, micaceous, brown, (Upper laeger).....	45 0	75 0	75' 0"
Shale, sandy, brown and buff.....	100 0	175 0	
Concealed, mostly shale.....	55 0	230 0	

	Thickness		Total		
	Ft. In.		Ft. In.		
Concealed, mostly grayish white sandstone, Guyandot , to top of boring (15)	100	0	330	0	255' 0"
(Continued with Log of Coal Test Boring No. 15 on Map II.)					
Surface (debris)	24	0	354	0	
Shale, dark, sandy	15	0	369	0	
Sandstone (Lower Guyandot)	32	2	401	2	
Coal, Sewell (1691.3' L.)	2	6	403	8	73' 8"
Slate	0	6	404	2	
Sandstone .....53' 10"	}				
Sandstone, slaty..26 0					
Slate, sandy.....10 0					
Sandstone, slaty.. 4 0					
Sandstone .....13 0					
Slate 4 0	}		126 10	531 0	
Sandstone .....16 0					
Coal, Little Raleigh , (1652.8' L.)	1	2	532	2	128' 0"
Slate	0	10	533	0	
Sandstone, slaty 29' 0"	}				
Slaty sandstone with bands.42 0					
Sandstone .....13 4	}		84 4	617 4	
Coal, Beckley (1475.4' L.)					
Sandstone, slaty.10' 7"	}		43 7	663 2	87' 5"
Sandstone .....33 0					
Slate, (Quinnimont)	25	0	688	2	
Sandstone .....53' 0"	}		99 4	787 6	
Slate, sandy..... 4 0					
Sandstone .....42 4					
Coal	0	2	787	8	
Sandstone	1	11	789	7	
Coal	0	2	789	9	
Sandstone	6	11	796	8	
Coal	0	3	796	11	
Sandstone	1	3	798	2	
Coal	0	2	798	4	
Sandstone	6	10	805	2	
Sandstone, with coal partings	2	9	807	11	
Coal	0	4	808	3	
Sandstone	1	2	809	5	
Coal	0	4	809	9	
Sandstone	2	6	812	3	
Sandstone, slaty	13	4	825	7	
Coal .....1' 8"	}		17 1	842 8	223' 1"
Slate .....9 0					
Sandstone, slaty..5 9					
Coal .....0 8	}				
Pocahontas Group (288' 8")					
Sandstone, (Flattop Mountain)	35	8	878	4	
Slate	14	0	892	4	
Slate, with hard partings	21	0	913	4	70' 8"
Sandstone, slaty 10' 0"	}		66 0	979 4	
Sandstone .....51 0					
Sandstone, slaty. 5 0	}				

		Thickness	Total	
		Ft. In.	Ft. In.	
Slate		1 11	981 3	
Coal .....1' 1"	} No. 6 Poca-			
Slate .....0 4		4 3	985 6	72' 2"
Coal .....1 4				
Coal, slaty.....1 6				
Sandstone .....29' 10"	} (Eckman)...	54 10	1040 4	
Sandstone, slaty 1 0				
Sandstone .....2 0				
Sandstone, slaty 22 0				
Coal, No. 4 Pocahontas, (1049.0' L.)...		5 8	1046 0	60' 6"
Slate		3 4	1049 4	
Sandstone, (Upper Pocahontas).....		24 4	1073 8	
Coal, (No. 3 Pocahontas "Rider").....		0 4	1074 0	
Sandstone, with coal partings.....		11 4	1085 4	
Sandstone		4 0	1089 4	
Slate		4 10	1094 2	
Coal		0 1	1094 3	
Slate		3 1	1097 4	
Sandstone, slaty.....		15 0	1112 4	
Slate		1 0	1113 4	
Coal, No. 3 Pocahontas (977.8' L.)....		3 11	1117 3	71' 3"
Slate		4 1	1121 4	
Sandstone, to bottom of hole.....		10 0	1131 4	14' 1"

The above is a very important section in that the true position of the Pineville Sandstone is shown, as also the Sewell, Beckley and No. 9 Pocahontas Coals. The latter is very irregular in this region as may be observed at its crop 0.6 mile southeastward along the road on the north bank of Guyandot River. The Fire Creek and Little Fire Creek veins have been cut away entirely by the unusual sandstone development at their horizons.

Barkers Ridge District.

Barkers Ridge District, lying in the southeastern point of Wyoming County, is in the region of outcropping rocks of the New River and Pocahontas Groups exclusively, the areal extent of the latter probably exceeding that for the former. In the western edge of the district, the following is obtained by combining an aneroid section measured by Gawthrop northwestward mostly along the hill road on the head of Little Whiteoak Creek, tributary to Pinnacle, with the log of a diamond drill boring which was sunk by the United States Coal & Coke Co. and is located on the west bank of Little White-

oak, about 125 yards southeast of the mouth of Jenny Branch. With the exception of the corrections and additions in parentheses, the record of the boring is as published on pages 98-99 of Volume II(A) in 1908:

Little Whiteoak Creek Section, Barkers Ridge District.

Pennsylvanian (1355' 6")	Thickness.	Total.	
New River Group (730')	Ft. In.	Ft. In.	
Concealed from top of knob.....	50 0	50 0	
Shale, brownish gray, silicious.....	10 0	60 0	
Sandstone, massive, coarse grained, soft, gray.....	50 0	110 0	
Concealed, mostly shale.....	25 0	135 0	
Sandstone, Guyandot, massive, soft, coarse grained, brownish gray...	40 0	175 0	
Coal blossom, heavy, Sewell "B" (2270' B.).....	0 0	175 0	175' 0"
Shale and concealed.....	5 0	180 0	
Sandstone, massive, medium grained, hard, gray.....	15 0	195 0	
Concealed, with sandstone.....	20 0	215 0	
Sandstone, massive, medium grained, hard.....	15 0	230 0	
Shale, sandy.....	5 0	235 0	
Concealed.....	10 0	245 0	
Sandstone, flaggy, shaly.....	10 0	255 0	
Sandstone massive, brownish gray, hard, (Lower Guyandot).....	25 0	280 0	
Concealed.....	10 0	290 0	
Coal blossom, visible 0' 8", Sewell....	0 8	290 8	115' 8"
Shale.....	1 4	292 0	
Sandstone, massive, hard, grayish brown, Welch.....	23 0	315 0	
Concealed.....	5 0	320 0	
Coal blossom, visible 0' 10", Welch....	0 10	320 10	30' 2"
Concealed.....	4 2	325 0	
Sandstone, shaly.....	20 0	345 0	
Concealed.....	15 0	360 0	
Sandstone, flaggy, shaly.....	10 0	375 0	
Concealed.....	5 0	380 0	
Sandstone, massive, gray, hard, fine grained.....	35 0	415 0	
Concealed.....	5 0	420 0	
Sandstone, massive, hard.....	15 0	435 0	
Concealed.....	5 0	440 0	
Sandstone, massive, gray, hard, fine grained...25' } (Lower Concealed.....25' } Raleigh) 85 0	85 0	525 0	
Sandstone, hard, fine grained, micaceous, grayish brown.....35' }			
Concealed.....	5 0	530 0	
Sandstone.....	13 0	543 0	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Concealed	20	0	563	0
Sandstone, hard, brownish gray.....	10	0	573	0
Coal blossom, Fire Creek.....	2	0	575	0
Concealed	5	0	580	0
Shale, gray, silicious.....	10	0	590	0
Sandstone, flaggy.....	10	0	600	0
Concealed	25	0	625	0
Sandstone, hard, gray.....	10	0	635	0
Concealed	20	0	655	0
Sandstone	5	0	660	0
Concealed	50	0	710	0
Sandstone, hard, massive, gray.....	5	0	715	0
Concealed to creek, 1715' L.....	15	0	730	0
Pocahontas Group (625' 6")				
Concealed, mostly sandstone to top of boring (22) at 1670' L.....	45	0	775	0
(Continued with log of Coal Test Boring No. 22 on Map II):				
Sandstone and boulders.....	16	0	791	0
Sandstone, (Pierpont).....	89	0	880	0
Sandstone, slaty.. 20' 0" } (Eckman and Up- Sandstone 110 6 } per Pocahontas)	130	6	1010	6
Slate	20	2	1030	8
Coal, No. 3 Pocahontas.....	5	7	1036	3
Slate, sandy.....	26	9	1063	0
Sandstone, (Lower Pocahontas).....	32	0	1095	0
Slate	5	0	1100	0
Coal, No. 2 Pocahontas.....	0	6	1100	6
Slate	4	6	1105	0
Sandstone, (Vivian).....	32	6	1137	6
Coal, slaty (No. 1 Pocahontas).....	1	6	1139	0
Sandstone, slaty 5' 0" } Landgraff ..	30	9	1169	0
Sandstone .....25 0 }				
Slate, sandy.....	3	0	1172	0
Coal, (Landgraff).....	0	2	1172	2
Slate, sandy.....	22	10	1195	0
Sandstone, (Keystone).....	4	0	1199	0
Slate	8	11	1207	11
Coal, (Keystone).....	0	10	1208	9
Slate	5	3	1214	0
Slate, sandy.....	12	0	1226	0
Sandstone	10	0	1236	0
Slate	5	0	1241	0
Sandstone	17	0	1258	0
Sandstone, slaty.....	16	0	1274	0
Sandstone	5	0	1279	0
Sandstone, slaty.....	16	0	1295	0
Sandstone	30	0	1325	0
Slate	4	0	1329	0
Sandstone	14	0	1343	0
Slate	8	0	1351	0
Sandstone	2	0	1353	0
Conglomerate	2	6	1355	6

255' 0"

155' 0"

45' 0"

261' 3"

64' 3"

38' 6"

33' 2"

36' 7"

146' 9"

	Thickness Ft. In.	Total Ft. In.	
Mississippian (13' 6")			
Mauch Chunk Series (13' 6")			
Shale, red and green, to bottom of boring	13 6	1369 0	13' 6"

The foregoing section is important in that not only is the entire thickness of the Pocahontas Group represented, but the true positions of the Sewell "B," Landgraff and Keystone Coals are also exhibited. The interval from No. 3 Pocahontas Coal to the base of the Pottsville—319' 3"—is almost as great as in southeastern McDowell, while only 10 miles southwestward at Davy, McDowell County, the same interval is only 122 feet. This great variation is additional evidence of unconformity existing at the base of the latter measures as mentioned at the beginning of this Chapter.

The following section was measured with aneroid by the writer in the northern edge of Barkers Ridge District, northward down the south hillside of Guyandot River to the Virginian Railway grade at Mullens. Owing to the rise of the strata in this direction along the nose of the Mullens Anticline, the intervals are slightly less than they should be:

Mullens Section, Barkers Ridge District.

Pennsylvanian (527.5')	Thickness Feet.	Total Feet.	
New River and Pocahontas Groups (527.5')			
Concealed			
Coal prospect, visible 2' 0", Fire Creek.....	2	2	2'
Sandstone and concealed.....	208	210	
Shale	0.5	210.5	
Coal, 1' 6", No. 7 Pocahontas (1740' B.).....	1.5	212	210'
Fire clay.....	1	213	
Sandstone and concealed.....	69	282	
Concealed in bench.....	15	297	
Sandstone, cliff, Eckman and Upper Pocahontas	90	387	
Concealed	25	412	
Shale	1	413	
Coal, soft...1' 0" }			
Bone .....0 1½ }			
Coal .....0 3 }			
Bone .....0 1½ }			
Coal, soft...3 0 }			
Slate and concealed to Virginian Railway grade at Mullens.....	110	527.5	
			No. 3 Pocahontas (1535' B.)..... 4.5 417.5 205.5"

The following section was measured by Gawthrop with aneroid eastward down the hill road to the bed of Gooney Otter Creek, $\frac{1}{4}$ mile northwest of Herndon, roughly along the strike of the strata:

Herndon Section, Barkers Ridge District.

Pennsylvanian (622')	Thickness	Total	
New River Group (345')	Feet.	Feet.	
Sandstone, massive, medium hard, grayish brown, Upper Raleigh , from top of ridge	25	25	
Concealed, with shale.....	15	40	
Sandstone, massive, hard, grayish brown, cliff, Lower Raleigh	35	75	
Concealed	60	135	
Coal .....0' 4" }			
Fire clay.....2 6 } Beckley (4' 2")			
Sandstone, with coal streaks..0 10 }	(2350' B).....	4	139 139'
Coal .....0 6 }			
Shale	6	145	
Concealed	35	180	
Shale, brownish gray, silicious, Quinnimont .	15	195	
Concealed	15	210	
Shale, gray.....	6	216	
Coal , soft, columnar.3' 0" }			
Fire clay, concealed and shale.....5 0 }	Fire Creek	9	225 86'
Coal , soft, columnar.1 0 }			
Fire clay and concealed.....	15	240	
Sandstone, flaggy.....	10	250	
Concealed, with shale.....	40	290	
Sandstone, massive.....	15	305	
Concealed	40	345	120'
Pocahontas Group (267')			
Sandstone, hard, gray, micaceous.....	10	355	
Concealed	35	390	
Coal blossom , visible 1' 0", No. 7 Pocahontas	0	390	45
Concealed	10	400	
Sandstone, shaly and soft.....	10	410	
Shale, brownish gray, silicious.....	10	420	
Sandstone, massive, hard, grayish brown....	10	430	
Shale, gray, flaggy, silicious.....	10	440	
Concealed	10	450	
Shale, bluish gray.....	6	456	
Coal , soft, columnar, 4' 3", No. 6 Pocahontas	4	460	
Shale	10	470	
Concealed	5	475	
Shale, gray, silicious.....	10	485	
Concealed	5	490	
Sandstone, massive, Eckman	20	510	
Concealed	60	570	
Concealed, mostly sandstone.....	35	605	
Concealed and shale to railroad grade.....	5	610	

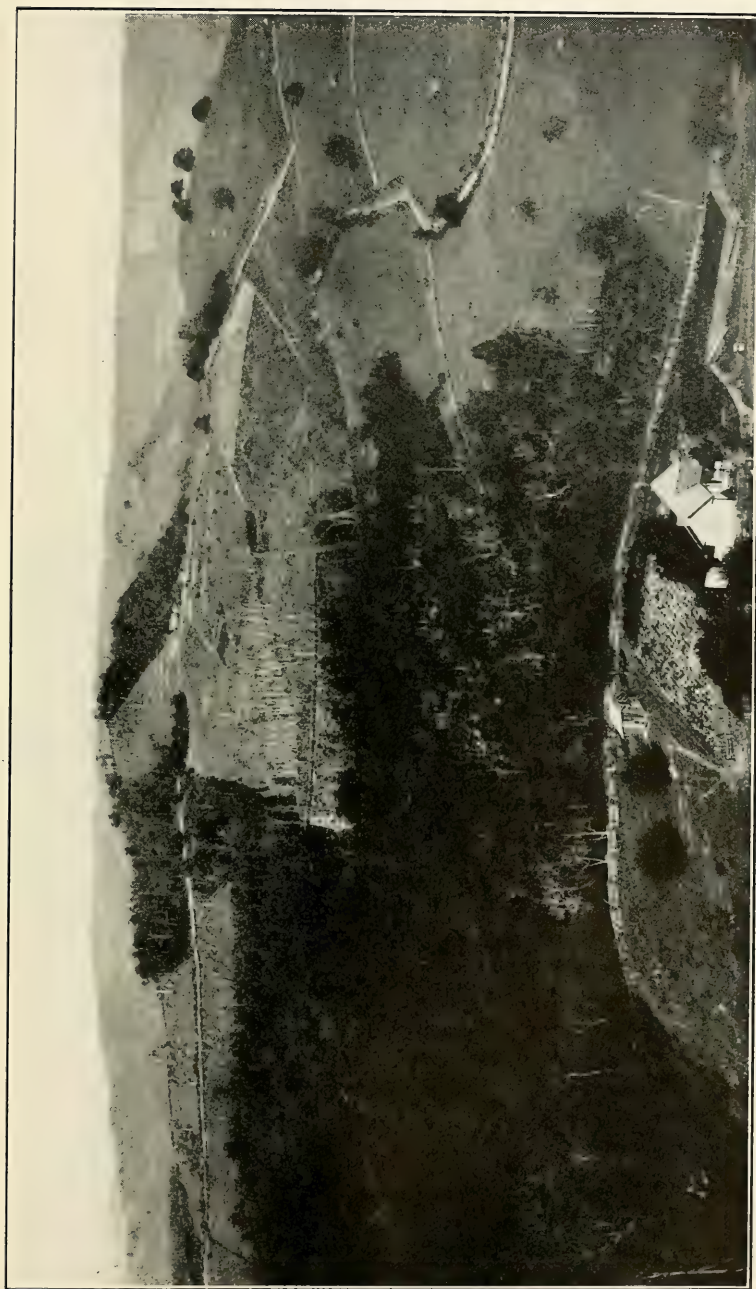


PLATE VI—Showing topography of New River and Pocahontas Groups along crest of Flattop Mountain on Wyoming-Mercer Line, looking northeast from summit of Pilot Knob.

	Thickness	Total	
	Feet.	Feet.	
Concealed and shale.....	5	615	
Coal , columnar...1' 2"	} No. 3 Pocahontas 4' 6" (1870' B.)	5	160'
Bone.....0 6			
Coal , soft, columnar.....2 4			
Coal , harder.....0 6			
Shale and concealed to run.....	2	622	

Five miles westward, the following succession is obtained in the southwest border of the same district by combining a section measured with aneroid southwestward mostly along the road leading down the north hillside of Pinnacle Creek to the mouth of Whiteoak Branch, with the log of a diamond drill boring (25) sunk by the United States Coal & Coke Co. and located one-eighth mile up the latter stream. With the exception of the corrections and additions in parentheses, the log of this boring is as published on page 100 of Volume II(A) in 1908:

Mouth of Whiteoak Branch Section, Barkers Ridge District.

Pennsylvanian (835')	Thickness	Total	
New River Group (515')	Ft. In.	Ft. In.	
Concealed from top of knob.....	25 0	25 0	
Sandstone, coarse, brown, Lower Guy- andot	20 0	45 0	
Coal , with partings, Sewell (2300' B.)	5 0	50 0	50' 0"
Fire clay.....	5 0	55 0	
Sandstone, coarse, brown, Welch	23 0	78 0	
Coal , Welch	2 0	80 0	30' 0"
Fire clay, and concealed, mostly sand- stone.....	125 0	205 0	
Sandstone, massive, current bedded, with large concretionary masses, Lower Raleigh	80 0	285 0	
Concealed.....	20 0	305 0	
Coal blossom , Beckley	0 0	305 0	225' 0"
Shale, buff, sandy.....	25 0	330 0	
Coal blossom , Fire Creek	0 0	330 0	25' 0"
Concealed and fire clay.....	5 0	335 0	
Sandstone, massive.....	45 0	380 0	
Concealed, mostly shale, sandy.....	20 0	400 0	
Concealed and shale.....	15 0	415 0	
Coal , 0' 4".....	0 0	415 0	85' 0"
Fire clay.....	5 0	420 0	
Shale, buff, sandy.....	20 0	440 0	
Sandstone, flaggy.....	10 0	450 0	
Concealed.....	5 0	455 0	
Sandstone, coarse, friable, pinkish....	35 0	490 0	
Concealed, mostly shale.....	25 0	515 0	100' 0"

	Thickness	Total	
	Ft. In.	Ft. In.	
Pocahontas Group (320')			
Sandstone, coarse, brown and reddish, making cliff (Flatop Mountain)..	75 0	590 0	
(Continued with the log of Coal Test Boring No. 25 on Map II):			
Sandstone and boulders.....	6 0	596 0	
Sandstone	6 0	602 0	
Slate	1 0	603 0	
Sandstone (Pierpont).....	41 0	644 0	
Slate	32 0	676 0	
Coal, No. 6 Pocahontas.....	0 3	676 3	161' 3"
Slate, sandy.....	5 9	682 0	
Sandstone, (Eckman).....	74 0	756 0	
Slate	1 6	757 6	
Coal, No. 4 Pocahontas.....	0 8	758 2	81' 11"
Slate	6 10	765 0	
Slate, sandy.....	8 0	773 0	
Slate	8 0	781 0	
Sandstone, slaty, (Upper Pocahontas)	17 0	798 0	
Slate, sandy.....	3 9	801 9	
Coal, (No. 3 Pocahontas "Rider").....	0 3	802 0	43' 10"
Sandstone, slaty.....	3 0	805 0	
Slate, sandy.....	13 0	818 0	
Slate	1 10	819 10	
Coal, No. 3 Pocahontas.....	5 2	825 0	33' 0"
Slate	10 0	835 0	10' 0"

Six miles southeastward on Pinnacle Creek, in the southern border of the same district, the following section was measured with aneroid by Gawthrop mostly along the road leading down the north hillside of the latter stream, one mile southwest of "Bailey Chapel":

Bailey Chapel Section, Barkers Ridge District.

Pennsylvanian (770')	Thickness	Total	
New River Group (265')	Feet.	Feet.	
Unrecorded from top of knob to road forks, estimated	90	90	
Concealed, with sandstone and shale.....	5	95	
Sandstone, soft, massive, gray.....	30	125	
Concealed	15	140	
Coal blossom, visible 0' 8", Little Fire Creek	0	140	140'
Concealed and fire clay.....	10	150	
Shale, sandy.....	10	160	
Sandstone, shaly.....	5	165	
Concealed and shale.....	25	190	
Coal, trace.....	0	190	50'
Shale and fire clay.....	5	195	
Sandstone, massive, brownish gray, medium hard, coarse, Pineville.....	25	220	
Concealed	10	230	
Shale	10	240	

	Thickness Feet.	Total Feet.	
Concealed	5	245	
Coal blossom, No. 9 Pocahontas, (2670' B.)	0	245	55'
Concealed, mostly shale.....	20	265	
Pocahontas Group (505')			
Sandstone, massive, coarse grained, gray, micaceous, Flattop Mountain.....	73	338	
Shale, coal streaks 1' 6" } No. 7 Pocahontas (2' 2")	2	340	95'
Coal .....0 8 }			
Shale	5	345	
Concealed	30	375	
Coal, trace.....	0	375	35'
Concealed	30	405	
Shale, gray, silicious.....	6.5	411.5	
Coal, soft, columnar.1' 3" } No. 6 Pocahontas Coal, medium soft, (3' 5").....	3.5	415	40'
columnar .....2 2 } (2500' B.)			
Shale, gray, silicious.....	10	425	
Sandstone	5	430	
Concealed	40	470	
Shale, gray, silicious.....	5	475	
Sandstone, flaggy, broken.....	20	495	
Concealed, with sandstone.....	15	510	
Sandstone, massive, gray, silicious.....	35	545	
Sandstone, flaggy.....	10	555	
Concealed	50	605	
Shale, gray, silicious.....	5	610	
Coal, medium, soft..1' 2½" }			
Bone, 0" to.....0 1 }			
Coal .....0 1 } No. 3 Pocahontas Bone .....0 1½ } (4' 11")... 5	5	615	200'
Coal, soft, columnar.2 2 }			
Bone, 0" to.....1 1½ }			
Coal, medium soft...1 1½ }			
Shale and concealed.....	60	675	
Sandstone	10	685	
Concealed	10	695	
Coal blossom, No. 1 Pocahontas.....	0	695	80'
Concealed	15	710	
Sandstone, massive, gray.....	5	715	
Concealed to bed of Pinnacle Creek.....	55	770	

The writer measured the following section with aneroid in the extreme southeastern point of the same district north-eastward from the summit of a high knob down to the Virginian Railway grade at the west portal of the Clarks Gap Tunnel:

Clarks Gap Section, Barkers Ridge District.

Pennsylvanian (534' 5")	Thickness	Total	
New River Group (245')	Ft. In.	Ft. In.	
Sandstone, Quinnimont , from top of knob, $\frac{1}{2}$ mile southwest of Clarks Gap	15 0	15 0	
Concealed	15 0	30 0	
Shale, Quinnimont , buff, sandy, with thin sandstone layers.....	52 0	82 0	
Coal blossom , heavy, Fire Creek (2940' B.).....	3 0	85 0	85' 0"
Shale, buff.....	24 0	109 0	
Coal , Little Fire Creek	1 0	110 0	25' 0"
Concealed	10 0	120 0	
Sandstone, soft, Pineville	85 0	205 0	
Shale, buff.....	15 0	220 0	
Coal .....0' 8" } No. 9 Pocahontas	5 0	225 0	115' 0"
Shale, yellow..3 8 }			
Coal .....0 8 }			
Sandstone	15 0	240 0	
Concealed	5 0	245 0	
Coal blossom , No. 8 Pocahontas	0 0	245 0	20' 0"
Pocahontas Group (289' 5")			
Shale and fire clay.....	14 0	259 0	
Coal , No. 7 Pocahontas	1 0	260 0	15' 0"
Shale	10 0	270 0	
Coal , 0' 2".....	0 0	270 0	10' 0"
Shale, buff, sandy.....	45 0	315 0	
Concealed	45 0	360 0	
Coal blossom , heavy, No. 6 Pocahontas	0 0	360 0	90' 0"
Concealed	110 0	470 0	
Sandstone, Upper Pocahontas	17 0	487 0	
Coal , No. 3 Pocahontas "Rider"	0 3	487 3	
Shale, gray.....	1 0	488 3	
Sandstone, Upper Pocahontas	30 0	518 3	
Coal , soft...1' 3" } No. 3 Pocahontas			
Bone, 7" to.0 10 } (2506' L.).....	5 2	523 5	163' 5"
Coal , soft...3 2 }			
Shale and fire clay.....	4 0	527 5	
Sandstone, Lower Pocahontas , to rail-way grade.....	7 0	534 5	114' 0"

McDOWELL COUNTY SECTIONS.

Sandy River District.

Sandy River District, occupying the western third of McDowell County, is in a region covered by outcropping strata of the Kanawha and New River Groups exclusively, the former group including slightly less than one-half its areal extent. The detailed crop of each division is outlined on Map

II. Just across the line in the edge of Mingo County from the northwest border of the district, the following important section was measured by the writer at the type locality of the "**Dotson Sandstone**" of Campbell*, and the interval determined between this member and the marine fossiliferous Eagle Shale. The measurements were made from the summit of a high knob southwestward down the hillside of Tug Fork at a point one-half mile north of Wyoming Station, formerly Dotson:

Wyoming Station (Dotson) Section, Sandy River District.

Pennsylvanian (640')		Thickness.	Total.
Kanawha Group (532')		Feet.	Feet.
Sandstone, Eagle , massive, coarse, brown, making great cliff, capping knob.....	60	60	
Concealed in bench of Eagle or Middle War Eagle Coal	10	70	70'
Concealed, steep slope.....	15	85	
Sandstone Bens Creek , making cliff.....	35	120	50'
Concealed in bench (Bens Creek Coal horizon)	20	140	
Sandstone, flaggy.....	25	165	
Concealed in bench (Cedar Coal horizon)...	15	180	60'
Sandstone, Grapevine , massive.....	35	215	
Concealed	35	250	70'
Shale, Eagle , black, with marine fossils, mostly concealed.....	30	280	
Shale, dark.....	25	305	
Sandstone, Lower War Eagle , flaggy.....	55	360	110'
Concealed in flat bench, (Lower War Eagle Coal horizon).....	10	370	
Shale, dark.....	10	380	
Sandstone, Upper Gilbert , fine grained, platy at top, coarser and slightly pebbly at base, making great cliff.....	95	475	115'
Concealed (Glenalum Tunnel Coal horizon) ..	5	480	
Shale, sandy, flaggy, and laminated, Lower Gilbert Sandstone horizon	50	530	
Coal, Gilbert, 2"	0	530	
Fire clay and shale.....	2	532	57'
New River Group (108')			
Sandstone, Nuttall ("Dotson") , grayish white, quartzitic medium grained, with iron ore nodules, making great cliff, to N. & W. Ry. grade.....	73	605	
Concealed to bed of Tug Fork.....	35	640	108'

*M. R. Campbell, Tazewell Folio, U. S. Geol. Survey; 1898.

The foregoing section further strengthens the correlations of the basal portion of the Kanawha Group in this region as published in the Logan and Mingo Report.* The great cliff rock at the top is undoubtedly the same as immediately overlies the locally known "Middle War Eagle" or "Mohawk" Coal in this locality.

Slightly over a mile southeastward in the northwest edge of Sandy River District, the writer measured the following section with aneroid down the north hillside of Tug Fork at Mohawk via a commercial mine in the Eagle or "Mohawk" Coal:

Mohawk Section, Sandy River District.

Pennsylvanian (775')		Thickness	Total		
Kanawha Group (700')		Feet.	Feet.		
Concealed, mostly sandstone, from top of knob		90	90		
Concealed and shale, buff.....		90	180		
Sandstone, massive, coarse, brown, Eagle ...		54	234		
Coal , gas, medium hard, semi-splint .....4' 7"		Eagle ("Mohawk") (1530' B.)	6	240	240'
Shale, gray.....0 3					
Coal , gas.....0 6					
Shale, gray.....		1	241		
Sandstone, Bens Creek		34	275		
Concealed		10	285		
Sandstone, shaly.....		15	300		
Concealed		5	305		
Sandstone		10	315		
Concealed		15	330		
Coal , 0' 10", Cedar		0	330		90
Fire clay shale.....		5	335		
Sandstone, massive, gray, Grapevine		40	375		
Concealed		15	390		
Shale, buff.....		10	400		
Concealed		5	405		
Shale , dark, marine fossils, Eagle		25	430		100'
Sandstone and concealed.....		15	445		
Shale, concealed, and shale.....		15	460		
Coal , blossom, heavy, Little Cedar		0	460		30
Concealed		130	590		
Sandstone		20	610		
Shale		10	620		
Concealed, with sandstone.....		45	665		
Concealed		10	675		
Sandstone, soft.....		10	685		
Concealed		15	700		

*Hennen & Reger, W. Va. Geol. Survey, pp. 101-104; 1914.

	Thickness Feet.	Total Feet.
New River Group (75')		
Sandstone, massive, grayish white, cliff,		
Nuttall ("Dotson")	65	765
Concealed to Tug River.....	10	775

One-half mile southeastward, the following carefully determined spirit-level section was measured down the north-west hillside of Longpole Creek, 2,000 feet above the mouth of the latter, by Mr. G. J. Cooper, a mining engineer, of Welch, W. Va., who kindly furnished the Survey the data. The correlations in parentheses are by the writer:

Mouth of Longpole Creek Section, Sandy River District.

Pennsylvanian (880')	Thickness Ft. In.	Total Ft. In.	
Kanawha Group (680')			
Sandstone, from top of mountain,			
Brownstown	93 2	93 2	
Coal, (Powellton) , with 4" parting near center (1703' L.).....	3 10	97 0	97'
Sandstone	45 10	142 10	
Slate	3 0	145 10	
Coal ...2' 4" }			
Slate ...1 2 }			
Coal ...0 8 }			
Sandstone, (Eagle).....	50 6	200 6	
Coal ...1' 8" }			
Slate ...2 2 }			
Coal ...0 8 }			
Sandstone, mostly, partly concealed... (Eagle or "Mohawk")	4 6	205 0	55'
(bed of Longpole Creek at 1595' L.)			
Sandstone, mostly, partly concealed... (Cedar) (1440' L.)...	150 6	355 6	
Coal ...3' 0" }			
Slate ...0 8 }			
Coal ...0 10 }			
Sandstone, with shale and streaks of coal	4 6	360 0	155'
(bed of Longpole Creek at 1440' L.)			
Sandstone, with shale and streaks of coal to bed of Longpole Creek at 920' L.....	320 0	680 0	320'
New River Group (200')			
Sandstone, with shale and streaks of coal to bed of Longpole Creek at 920' L.....	200 0	880 0	200'

Two miles farther southeastward in the same district, the following succession is obtained for the Panther region by combining an aneroid section measured by the writer from the summit of a knob opposite the mouth of Shortpole Branch down the east hillside of Panther Creek, with the log of a diamond drill boring (31). This bore hole, located on the east bank of the latter stream, just below the mouth of Greenbrier

Fork and one-half mile southwest of Panther, was sunk by the Panther Lumber Company in 1904, and its record was kindly furnished the Survey by Wm. Leckie of Welch, W. Va.:

Panther Section, 0.7 Mile South, Sandy River District.

Pennsylvanian (1317' 3")		Thickness		Total	
Kanawha Group (440')		Ft.	In.	Ft.	In.
Concealed from summit opposite mouth of Shortpole Branch.....					
		25	0	25	0
Concealed in bench.....					
		5	0	30	0
Sandstone					
		15	0	45	0
Concealed, steep slope.....					
		10	0	55	0
Concealed (Cedar Coal horizon).....					
		5	0	60	0
Sandstone, platy bottom, massive top, Grapevine					
		45	0	105	0
Concealed and shale, black, Eagle					
		35	0	140	0
Concealed					
		35	0	175	0
Shale, buff, hard.....					
		15	0	190	0
Sandstone, fine grained, micaceous, Lower War Eagle					
		25	0	215	0
Sandstone, black and buff, fossil plants Coal , at opening, fallen shut, reported 4' 0", Lower War Eagle , (1430' B.)					
		4	0	245	0
Slate and concealed.....					
		5	0	250	0
Sandstone, making cliff, Upper Gilbert					
		25	0	275	0
Concealed and shale.....					
		60	0	335	0
Sandstone, cliff, Lower Gilbert					
		20	0	355	0
Concealed and shale.....					
		85	0	440	0
New River Group (877' 3")					
Sandstone, platy, gray and brown, Nuttall ("Dotson")					
		75	0	515	0
Concealed, steep bluff.....					
		78	0	593	0
Sandstone platy.....					
		8	0	601	0
Coal, Douglas , opening closed, reported 4' 0", with 10" shale parting 8" below top, (1070' B.).....					
		4	0	605	0
Slate and concealed.....					
		5	0	610	0
Sandstone, cliff, platy...30' } Lower					
Sandstone, flaggy, shaly...40 } Nuttall					
Shale, dark, flaggy, sandy, marine fossils, Douglas					
		11	0	691	0
Coal , very slaty, Lower Douglas					
		4	0	695	0
Shale, gray.....					
		5	0	700	0
Sandstone, massive, conglomerate, Panther , to top of boring.....					
		15	0	715	0
(Continued with log of Coal Test Boring 31 on Map II, elevation, 940' B.):					
Sand rock. 20' 0" } Panther					
Shale, light 1 8 } Sandstone					
Sand rock. 97 4 }					
		119	0	834	0

	Thickness	Total	
	Ft. In.	Ft. In.	
Shale, dark.....	1 8	835 8	
Sand rock 15' 0" } Upper Iaeger			
Slate, dark 13 4 } Sandstone	54 4	890 0	
Sand rock 26 0 }			
Shale, light, Upper Iaeger	46 0	936 0	221' 0"
Sand rock, Middle Iaeger	42 0	978 0	
Shale, dark...18' } Lower Iaeger Shale	49 0	1027 0	
Slate, black...31 }			
Sandstone, Harvey Conglomerate	4 0	1031 0	
Slate black, Sandy Huff Shale	62 0	1093 0	157' 0"
Hard rock, Guyandot Sandstone	80 0	1173 0	
Dark shale.....	6 0	1179 0	
Dark slate.....	0 10	1179 10	
Coal, bony, Sewell "B"	0 8	1180 6	87' 6"
Shale, dark.....	4 0	1184 6	
Hard sand rock.....	1 4	1185 10	
Dark shale.....	2 0	1187 10	
Sand rock, Lower Gilbert	54 0	1241 10	61' 4"
Fire clay, (horizon of Sewell Coal)	2 0	1243 10	
Shale, dark.....	10 0	1253 10	
Sand rock, Welch, to bottom	63 5	1317 3	75' 5"

The foregoing section shows the entire absence in this portion of McDowell County of the several Iaeger Coals, as also of the Sewell, which is in harmony with the general northwest thinning of the members of the Pottsville prevailing in the territory of this Report.

One mile eastward in the same district, the following succession of the strata is obtained by combining an aneroid section measured by the writer from the summit of a high knob, slightly less than a mile northeast of the mouth of Shortpole Branch of Tug, westward via the mine openings of the Panther Coal Company in the "Middle War Eagle" (Eagle) and Douglas Coal beds, with the log of a churn drill boring (30). The latter is located at Douglas Station on the north edge of the N. & W. Ry. and on the east bank of the branch mentioned, and it was drilled by the Panther Coal Co. for water at its power house, the log of which was kindly furnished the Survey by Robinson and Franklin of Iaeger, W. Va. The section is important in that it exhibits the relative position of the Douglas and Lower Douglas Coals at their type locality, as also their intervals to the "Middle War Eagle" and Iaeger seams. Above the Douglas Coal the intervals are greater than they should be, owing to the westward dip of the strata:

Douglas Station Section, Sandy River District.

Pennsylvanian (1302')		Thickness	Total			
Kanawha Group (810')		Feet.	Feet.			
Concealed, mostly sandstone, from top of knob		50	50			
Concealed, steep slope, mostly buff sandy shale		115	165			
Concealed in bench, (Matewan Coal horizon)		5	170	170'		
Concealed		4	174			
Sandstone, massive, coarse, brown, Matewan and Eagle		85	259			
Coal	0' 11 "	} Eagle or "Middle War Eagle" (1795' L.)..	6	265	95'	
Shale, gray.0	2					
Coal	0 2½					
Shale, gray.1	0					
Coal	3 4			5	270	
Fire clay and shale						
Sandstone, massive, light gray and yellowish, fine grained, micaceous, Bens Creek....		25	295			
Concealed		35	330			
Shale, sandy		25	355			
Sandstone		30	385			
Concealed		30	415			
Sandstone, flaggy.....		5	420			
Concealed		9.5	429.5			
Fire clay.....		0.5	430			
Concealed		29	459			
Shale, greenish black, Eagle (1575' B.).....		1	460		195'	
Concealed		115	575			
Coal, blossom, concealed (reported 4'), Lower War Eagle.....		0	575		115'	
Concealed		30	605			
Sandstone		5	610			
Concealed		65	675			
Coal, blossom, Glenalum Tunnel.....		0	675		100'	
Concealed and shale.....		10	685			
Sandstone, massive bottom, upper 5' shaly, gray and brown, Lower Gilbert.....		60	745			
Concealed		5	750			
Coal, blossom, Gilbert "A".....		0	750		75'	
Shale, dark, sandy, flaggy.....		30	780			
Shale, dark gray.....		6	786			
Concealed		4	790			
Coal, blossom, heavy, Gilbert.....		0	790		40'	
Fire clay and shale.....		14	804			
Coal, slaty, 0' 2".....		0	804			
Shale, dark, gray.....		6	810		20'	
New River Group (492')						
Sandstone, massive, coarse grained, white, micaceous, Nuttall ("Dotson").....		60	870			
Concealed and shale.....		78.5	948.5			

	Thickness Feet.	Total Feet.	
Coal, soft.....1' 2" }			
Slate, black, with coal streaks and plant fossils .....7 6 }	Douglas (11' 5")... 11.5 (1076' L.)	960	150'
Coal, slaty.....0 3 }			
Coal, soft.....2 6 }			
Fire clay and concealed.....	5	965	
Sandstone, massive, coarse, brown, Lower Nuttall	35	1000	
Concealed	5	1005	
Slate, buff, sandy.....	19	1024	
Slate, black, Lingula and other marine fos- sils, Douglas	1	1025	
Shale, buff, sandy.....	10	1035	
Concealed, and coal, Lower Douglas	5	1040	80'
Sandstone, massive, coarse, brown, with quartz pebbles, Panther , to top of boring (30)	45	1085	45
(Continued with Log of Water Well No. 30 on Map II, elevation, 951' L.)			
Surface	14	1099	
Sandstone, Panther and Upper Iaeger	165	1264	
Slate, blue.....	5	1269	
Coal, (Iaeger), (766' L.).....	1	1270	185'
Slate	25	1295	
Shale, gray.....	6	1301	
Slate, to bottom.....	1	1302	32'

Four miles eastward in the same district, the following section was measured with aneroid down the north hillside of Tug Fork at Iaeger:

Iaeger Section, Sandy River District.

	Thickness Feet.	Total Feet.	
Pennsylvanian (570')			
Kanawha Group (45')			
Sandstone, coarse, brown, from top of ridge.	25	25	
Concealed	20	45	45'
New River Group (525')			
Sandstone, coarse, brown, massive, Nuttall ("Dotson")	30	75	
Concealed	50	125	
Sandstone	5	130	
Concealed	10	140	
Shale, sandy and flaggy.....	25	165	
Shale, sandy, buff, hard, mostly concealed..	40	205	
Sandstone, flaggy at bottom, massive at top, gray, and brown, Lower Nuttall	35	240	
Concealed, with shale.....	5	245	
Sandstone, flaggy bottom, massive at top, grayish brown, cliff, Panther	25	270	

	Thickness Feet.	Total Feet.	
Shale, black, mostly concealed.....	59	329	
Sandstone, massive, coarse, brown.....	22	351	
Concealed and shale.....	4	355	
Sandstone, dove colored, medium grained, micaceous, Upper laeger	50	405	
Concealed, mostly dark shale, Upper laeger .	55	460	
Shale, buff, sandy, fossil plants.....	13	473	
Coal, laeger , (2' to 3') (1075' B.).....	2	475	430'
Shale and concealed.....	5	480	
Sandstone, massive, Middle laeger	32	512	
Shale, buff.....	2	514	
Coal, Lower laeger	1	515	40'
Concealed, to railroad grade, at highway bridge across Tug Fork.....	55	570	

Two miles due north of Iaeger, the following aneroid section was measured by the writer down the west hillside of Johnnycake Branch via country banks in the Gilbert and Douglas Coals:

Johnnycake Branch Section, Sandy River District.

Pennsylvanian (257')	Thickness Feet.	Total Feet.	
New River Group (257')			
Concealed			
Sandstone, medium grained, massive, mica- ceous, Lower Gilbert	7	7	
Shale, buff, sandy, with plant fossils.....	3	10	
Coal , gas.....0' 1½" }			
Slate, black, ⅜" to .0 0¾ } Gilbert (2' 2½") 2		12	12'
Coal , columnar, me- dium hard.....2 0¾ } (1390' B.)			
			(No. 19 on Map II)
Shale and concealed.....	90	102	
Shale, sandy, dark, with plant fossils.....	33	135	
Coal , (1' 10½"), Douglas	2	137	125'
Slate, shale, and concealed.....	63	200	
Sandstone, massive.....	6	206	
Coal , gas, soft, 0' 10", Lower Douglas	1	207	70'
Shale	5	212	
Concealed	20	232	
Sandstone, Upper laeger	25	257	

One mile and a half due east of Iaeger in the same district, the following section and bore hole record combined were kindly furnished the Survey by Mr. G. J. Cooper of Welch. The boring (No. 37 on Map II) is located at the mouth of Right Fork of Harman Branch, and the section was

determined with aneroid down the long point immediately to the southeast of the well. Hence, intervals above the Iaeger Coal are slightly excessive:

Harman Branch Section, Sandy River District.

Pennsylvanian (1097' 6")	Thickness	Total	
Kanawha Group (199' 10")	Ft. In.	Ft. In.	
Shale and unrecorded from top of mountain	197 6	197 6	
Coal, Gilbert (1675' B.)	2 4	199 10	199' 10"
New River Group (897' 8")			
Slate and unrecorded	73 0	272 10	
Coal, Douglas (1600' B.)	2 0	274 10	75' 0"
Slate and unrecorded	74 0	348 10	
Coal, Lower Douglas	1 0	349 10	75' 0"
Slate and unrecorded	214 0	563 10	
Coal (1310' B.)	1 0	564 10	215' 0"
Fire clay and unrecorded	7 7	572 5	
Coal, Iaeger, (1300' B.)	2 3	574 8	9' 10"
Sandstone and unrecorded	255 1	829 9	
Coal, Sewell "B"	0 4	830 1	255' 5"
Sandstone and unrecorded	114 1	944 2	
Coal, Welch	0 2	944 4	114' 3"
Sandstone and unrecorded	49 3	993 7	
Coal, Little Raleigh (868' L.)	1 5	995 0	50' 8"
Sandstone and unrecorded	95 5	1090 5	
Coal, Beckley, (769.5' L.)	3 1	1093 6	98' 6"
Slate, black, and hard sandstone	4 0	1097 6	

Four and a half miles southward in the same district, the following succession is obtained by combining an aneroid section measured by the writer down the northeast hillside of Ring Branch of Dry Fork, with the log of a diamond drill boring (38 on Map II). The latter, located one-eighth mile up the former stream, was drilled by the McDowell-Pocahontas Coal and Land Company. H. N. Eavenson, of Gary, W. Va., is authority for the record:

Section One Mile South of Avondale, Sandy River District.

Pennsylvanian (1757' 6")	Thickness	Total	
Kanawha Group (110')	Ft. In.	Ft. In.	
Concealed, mostly sandstone, from top of mountain	35 0	35 0	
Sandstone	40 0	75 0	
Shale and concealed on bench	35 0	110 0	110' 0"

	Thickness Ft. In.	Total Ft. In.	
New River Group (1214' 7")			
Sandstone, medium grained, forms cliff.....40'	} Nuttall or "Dotson"	86 0	196 0
Shale and concealed.....20			
Sandstone, massive, coarse, brown .....26			
Concealed	8 0	204 0	
Coal, Douglas (1860' B.).....	1 0	205 0	95' 0"
Fire clay and shale.....	35 0	240 0	
Sandstone, massive, gray and brown, medium grained, forms cliff, Lower Nuttall	100 0	340 0	
Concealed and shale.....	10 0	350 0	
Sandstone, massive at bottom, flaggy and shaly at top, Upper laeager ...	100 0	450 0	
Concealed, mostly Upper laeager Shale	41 0	491 0	
Coal blossom , heavy, laeager (1565' B.)	0 0	491 0	286' 0"
Sandstone, Middle laeager	54 0	545 0	
Concealed	5 0	550 0	
Shale, Lower laeager , mostly concealed	45 0	595 0	
Sandstone, medium coarse, brown and buff, making cliff, Harvey	55 0	650 0	
Shale dark, mostly concealed, Sandy Huff	60 0	710 0	
Concealed, mostly flaggy sandstone...	20 0	730 0	
Sandstone	45 0	775 0	
Concealed to Welch Coal horizon	140 0	915 0	424' 0"
Concealed to top of Coal Test Boring (38)	50 0	965 0	
(Continued with the Log of Coal Test Boring No. 38 on Map II, ele- vation, 1090' H. L.):			
Sand and boulders.....	14 0	979 0	
Sandstone, hard, Lower Raleigh	76 0	1055 0	
Shale, with sandstone partings.....	17 0	1072 0	
Shale, sandy.....	3 2	1075 2	
Sandstone	6 0	1081 2	
Sandstone, with shale partings.....	3 3	1084 5	
Coal .....0' 4	} Beckley	1 6	1085 11 170' 11"
Shale, dark....0 11			
Coal .....0 3			
Fire clay.....	0 6	1086 5	
Shale, dark.....	8 4	1094 9	
Sandstone, shale partings.....	1 8	1096 5	
Sandstone	17 7	1114 0	
Shale, sandy.....	6 0	1120 0	
Shale, dark.....	3 6	1123 6	
Slate, black.....	0 7	1124 1	
Coal .....0' 3"	}	1 7	1125 8 39' 9"
Slate, dark.....0 8			
Bony slate.....0 8			
Fire clay.....	2 0	1127 8	
Shale, sandy.....	1 4	1129 0	
Sandstone, hard.....	53 0	1182 0	
Shale, dark.....	11 8	1193 8	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Slate, black.....	0	8	1194	4	
Coal, Fire Creek.....	2	8	1197	0	71' 4"
Fire clay.....	0	4	1197	4	
Shale	31	0	1228	4	
Sandstone, with shale partings.....	36	6	1264	10	
Shale, dark.....	3	0	1267	10	
Slate, with coal partings (Little Fire Creek)	1	3	1269	1	72' 1"
Shale, dark.....	1	0	1270	1	
Shale, sandy.....	28	6	1298	7	
Shale, with sandstone partings.....	7	0	1305	7	
Slate, with coal partings.....	1	2	1306	9	37' 8"
Shale, dark.....	0	6	1307	3	
Sandstone	1	0	1308	3	
Shale, dark.....	3	4	1311	7	
Slate, with coal partings, No. 9 Pocahontas	1	0	1312	7	5' 10"
Shale, gray.....	1	0	1313	7	
Shale, sandy.....	11	0	1324	7	
Pocahontas Group (432' 11")					
Sandstone, hard, Flattop Mountain...	148	6	1473	1	
Sandstone, soft.....	3	0	1476	1	
Sandstone and lime.....	2	0	1478	1	
Sandstone, shale parting.....	3	0	1481	1	
Shale, dark.....	3	9	1484	10	
Shale, sandy.....	12	0	1496	10	
Shale, dark.....	2	9	1499	7	
Coal, No. 6 Pocahontas.....	0	2	1499	9	187' 2"
Fire clay.....	1	3	1501	0	
Shale, sandstone partings.....	17	0	1518	0	
Sandstone, soft.....	15	6	1533	6	
Shale, with sandstone partings.....	8	8	1542	2	
Sandstone, soft, Eckman.....	46	10	1589	0	
Sandstone, hard.....	16	0	1605	0	
Slate, black.....	2	3	1607	3	
Shale, dark.....	5	3	1612	6	
Shale, light.....	1	6	1614	0	
Shale and sandstone.....	6	2	1620	2	
Sandstone, shale partings.....	5	0	1625	2	
Sandstone	6	6	1631	8	
Shale, sandy.....	5	5	1637	1	
Sandstone	0	10	1637	11	
Shale, sandy.....	9	4	1647	3	
Slate, black.....	0	2	1647	5	
Bone ...0' 3" }					
Coal ...0 5 }					
Slate ...0 1 }					
Coal ...0 5 }	2	2	1649	7	149' 10"
Slate ...0 1 }					
Coal ...0 1 }					
Slate ...0 5 }					
Coal ...0 5 }					
Fire clay, sandy.....	0	6	1650	1	
Sandstone, Lower Pocahontas.....	34	0	1684	1	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Shale, sandy.....	1	6	1685	7	
Sandstone, hard.....	0	8	1686	3	
Shale, sandy.....	2	2	1688	5	
Sandstone	12	6	1700	11	
Sandstone, shale parting.....	8	1	1709	0	
Shale, sandstone partings.....	6	6	1715	6	
Shale, sandy.....	1	6	1717	0	
Sandstone, soft, Vivian.....	33	1	1750	1	
Slate, soft.....	0	1	1750	2	
Coal .....0' 1½"	No. 1 Poca- hontas..... (302' L.)	2	8	1752 10	103' 3"
Slate, soft.....0 2					
Slate and coal..0 9					
Coal .....1 5½					
Slate .....0 0¼					
Coal .....0 1¾	1	6	1754	4	
Slate, black.....					
Fire clay to bottom.....					
	3	2	1757	6	

Four miles southward in the extreme eastern edge of the same district, the following succession is obtained by combining an aneroid section measured by the writer down the north hillside of Dry Fork, ½ mile southeast of Bradshaw, with the log of a diamond drill boring (39). The latter is located on the south bank of the stream last mentioned, at the mouth of Dry Branch, and it was drilled by the McDowell-Pocahontas Coal and Land Company. H. N. Eavenson, of Gary, W. Va., is authority for the record. Both this and the preceding section show the No. 3 Pocahontas Coal thinned below minable dimensions and purity:

Bradshaw Section, Sandy River District.

Pennsylvanian (1753' 3") Kanawha Group (150')	Thickness		Total	
	Ft.	In.	Ft.	In.
Concealed and shale from top of knob.	50	0	50	0
Sandstone, cliff, massive, medium grained, micaceous, brown, Lower Gilbert	40	0	90	0
Shale and concealed, mostly buff sandy shale	60	0	150	0

	Thickness Ft. In.	Total Ft. In.	
New River Group (1279' 10")			
Sandstone, coarse grained, mas- sive bottom, flaggy top...45'	Nuttall ("Dotson") Sandstone.....	125 0	275 0
Sandstone, flaggy, shaly, brown.15			
Shale, buff.....10			
Sandstone, cliff, coarse, brown55			
Concealed	5 0	280 0	
Coal blossom, Douglas (1955' B.).....	0 0	280 0	280' 0"
Concealed and shale.....	20 0	300 0	
Sandstone, mostly concealed on steep slope	30 0	330 0	
Concealed on bench.....	5 0	335 0	
Coal blossom, Lower Douglas (1885' B.)	0 0	335 0	55' 0"
Shale	2 0	337 0	
Sandstone, flaggy, to bench.....	23 0	360 0	
Concealed	10 0	370 0	
Sandstone, cliff, flaggy.....	35 0	405 0	
Shale, dark, sandy, flaggy, mostly con- cealed	30 0	435 0	
Sandstone, cliff (Panther).....	30 0	465 0	
Concealed	5 0	470 0	
Coal blossom, laeager "B" (1750' B.)..	0 0	470 0	135' 0"
Sandstone, cliff, coarse grained, Up- per laeager.....	30 0	500 0	
Shale and concealed.....	10 0	510 0	
Sandstone	10 0	520 0	
Shale, Upper laeager , partly concealed	35 0	555 0	85' 0"
Sandstone, slaty, Middle laeager	40 0	595 0	
Shale, dark, Lower laeager , partly con- cealed	30 0	625 0	
Concealed along wide bench or terrace	10 0	635 0	
Concealed, mostly sandstone.....	30 0	665 0	
Sandstone, cliff, current bedded, me- dium grained, micaceous, Harvey Conglomerate	105 0	770 0	
Shale, sandy, partly concealed.....	50 0	820 0	
Sandstone, Guyandot	43 0	863 0	
Concealed	2 0	865 0	
Coal blossom, Sewell "A" (1355' B.)..	0 0	865 0	310' 0"
Sandstone, Lower Guyandot	30 0	895 0	
Concealed on bench, Sewell Coal hori- zon	20 0	915 0	50' 0"
Sandstone, Welch	70 0	985 0	
Shale, sandy.....	5 0	990 0	
Concealed	5 0	995 0	
Coal blossom, Welch (1225' B.).....	0 0	995 0	80' 0"
Sandstone, Upper Raleigh , to top of boring	40 0	1035 0	40' 0"
(Continued with the Log of Coal Test Boring No. 39 on Map II, 1185' B.):			

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	30	0	1065	0
Sandstone, with shale partings.....	3	6	1068	6
Sandstone, Lower Raleigh	89	0	1157	6
Coal, Beckley, (1060' B.)	2	10	1160	4
Fire clay.....	0	7	1160	11
Sandstone, Quinnimont	74	0	1234	11
Slate, black.....	0	2	1235	1
Coal	0	2	1235	3
Fire clay, sandy.....	2	0	1237	3
Shale, sandstone partings.....	9	0	1246	3
Coal and slate	0	6	1246	9
Shale, sandy.....	0	4	1247	1
Sandstone	21	3	1268	4
Sandstone, shale partings.....	10	0	1278	4
Shale, dark.....	0	3	1278	7
Coal, Fire Creek	1	10	1280	5
Fire clay.....	2	0	1282	5
Shale, sandy.....	2	0	1284	5
Sandstone, shale partings.....	12	0	1296	5
Shale, sandstone partings.....	10	0	1306	5
Shale, dark.....	28	1	1334	6
Coal ....1' 4" }				
Slate ...0 2 }				
Coal ....1 0 }				
} Little Fire Creek.... (883' B)				
Fire clay.....	0	7	1337	7
Shale, dark.....	5	6	1343	1
Coal	0	8	1343	9
Shale, dark.....	2	0	1345	9
Shale, sandy.....	29	0	1374	9
Shale, dark.....	0	8	1375	5
Coal, No. 9 Pocahontas	1	8	1377	1
Shale, dark.....	1	4	1378	5
Sandstone, hard.....	37	0	1415	5
Shale, sandy.....	14	0	1429	5
Coal No. 8 Pocahontas	0	5	1429	10
Pocahontas Group (323' 5")				
Fire clay.....	1	3	1431	1
Shale, sandy.....	18	6	1449	7
Sandstone, Flattop Mountain	27	10	1477	5
Sandstone, shale partings.....	12	0	1489	5
Coal, No. 7 Pocahontas	0	4	1489	9
Shale, sandy.....	20	8	1510	5
Slate and coal.....	2	2	1512	7
Shale, dark.....	1	0	1513	7
Sandstone, Pierpont	46	0	1559	7
Shale, dark.....	0	10	1560	5
Slate, black.....	0	3	1560	8
Coal, No. 6 Pocahontas	1	9	1562	5
Fire clay, sandy	1	0	1563	5
Shale, sandy.....	20	0	1583	5
Sandstone, Eckman	17	0	1600	5
Shale, blue.....	9	2	1609	7
Slate, black.....	4	10	1614	5
Coal, No. 5 Pocahontas	0	8	1615	1

125' 4"

120' 1"

56' 7"

40' 1"

52' 9"

59' 11"

72' 8"

52' 8"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, dark.....	24	4	1639	5
Coal	0	4	1639	9
Shale, light, sandy.....	19	0	1658	9
Sandstone	20	8	1679	5
Shale, dark, sandy.....	22	0	1701	5
Sandstone, Upper Pocahontas	51	0	1752	5
Slate, black, with coal streaks, No. 3				
Pocahontas, to bottom, (467' B.)..	0	10	1753	3 138' 2"

One and eight-tenths miles southwestward in the same district, the writer measured the following section with aneroid down the north hillside of Groundhog Branch via an opening in the Lower Douglas Coal:

Groundhog Branch Section, Sandy River District.

Pennsylvanian (785')		Thickness		Total
Kanawha Group (210')		Feet.	Feet.	
Concealed from top of mountain.....		20	20	
Concealed, mostly sandstone.....		50	70	
Sandstone, Upper Gilbert , coarse, brown, large quartz pebbles.....		10	80	
Concealed and shale.....		15	95	
Sandstone, cliff, Lower Gilbert		35	130	
Concealed and shale, hard, sandy, buff.....		80	210	210'
New River Group (575')				
Sandstone, cliff rock, massive, current bedded, medium grained, gray and brown, Nuttall ("Dotson")		50	260	
Concealed and shale.....		25	285	
Sandstone, current bedded, Lower Nuttall ..		25	310	
Concealed, mostly shale.....		60	370	
Shale, dark.....		16	386	
Coal , gas, soft 0' 7" } Shale, dark {				
gray, fossil plants ....0 8 { Lower Douglas		4	390	180'
Coal , gas.....2 4 { (3' 10")				
Coal , slaty....0 3 { (1835' B.)				
Fire clay shale and concealed.....		5	395	
Sandstone, great cliff, Panther		50	445	
Concealed		5	450	
Shale, sandy.....		5	455	
Concealed		10	465	
Shale, sandy.....		15	480	
Concealed		35	515	
Sandstone, flaggy.....		10	525	
Concealed		145	670	
Unrecorded to bed of Groundhog Branch, 0.6 mile above mouth.....		115	785	395'

One mile southward, the following section was measured with aneroid by the writer southwestward down the long point roughly along the strike of the strata to the mouth of Hite Fork of Bradshaw Creek. It illustrates the difficulties encountered generally throughout the forest region of the two counties, in that usually the most important details of the rock column are concealed by debris:

Hite Fork Section, Sandy River District.

Pennsylvanian (800')	Thickness	Total
	Feet.	Feet.
Kanawha Group (65')		
Concealed from top of ridge.....	25	25
Sandstone	10	35
Concealed, mostly shale.....	30	65
New River Group (735')		
Sandstone, massive, coarse, Nuttall ("Dot-son")	30	95
Concealed and shale.....	55	150
Sandstone, Lower Nuttall	25	175
Concealed, mostly shale.....	15	190
Fire clay, Lower Douglas Coal horizon (1920' B.)	0	190
Concealed and shale.....	10	200
Sandstone, massive, Panther	65	265
Concealed and shale, sandy.....	60	325
Sandstone	25	350
Concealed	5	355
Sandstone, cliff, Middle Iaeger	40	395
Concealed	15	410
Sandstone, massive.....	5	415
Shale and concealed.....	50	465
Sandstone	20	485
Concealed, mostly black and buff shale.....	60	545
Sandstone, cliff, Harvey Conglomerate	60	605
Concealed	10	615
Sandstone, cliff, Guyandot	40	655
Concealed, mostly black shale.....	35	690
Sandstone	10	700
Concealed and black shale.....	25	725
Sandstone	20	745
Concealed	30	775
Sandstone, Welch , to bed of Hite Fork....	25	800

In the southwest edge of Sandy River District, the following section was measured with aneroid by Gawthrop mostly along the hill road leading eastward down Bradshaw Creek. Owing to the rise of the strata in this direction, the intervals are slightly less than they should be. The coal at

40 feet from the top undoubtedly represents the Lower War Eagle bed, since the same seam belongs 80 to 100 feet below the marine fossiliferous Eagle Shale, 2 miles southwestward at Paynesville:

Paynesville (2 Miles N. E.) Section, Sandy River District

Pennsylvanian (765')	Thickness	Total	
Kanawha Group (250')	Feet.	Feet.	
Concealed from top of knob.....	40	40	
Coal, Lower War Eagle	0	40	40'
Shale and concealed.....	5	45	
Sandstone, massive, gray, soft, Upper Gilbert	65	110	
Concealed	14	124	
Coal, visible, 1' 0", Glenalum Tunnel, Upper Bench	1	125	85'
Shale	1	126	
Sandstone, massive.....	14	140	
Concealed	5	145	
Sandstone, massive, gray.....	10	155	
Coal, visible.....0' 8" } Glenalum			
Concealed and sand- } Tunnel....	15	170	45'
stone .....13 10 } Lower Bench			
Coal, visible.....0 6 }			
Concealed	80	250	80'
New River Group (515')			
Sandstone, massive, gray, soft, coarse grained, Nuttall	45	295	
Concealed	20	315	
Shale, gray, silicious.....	20	335	
Concealed	5	340	
Shale, gray, silicious.....	35	375	
Concealed (horizon of Douglas Coal).....	5	380	130'
Sandstone, flaggy.....	15	395	
Shale, bluish gray, silicious.....	10	405	
Sandstone, hard, massive, bluish gray, forms cliff. Lower Nuttall	40	445	
Sandstone, shaly.....	5	450	
Concealed	10	460	
Sandstone, shaly, Lower Nuttall	30	490	
Concealed	7	497	
Sandstone, shaly.....	5	502	
Shale, gray.....	1	503	
Coal, soft, columnar...1' 8" } Lower Douglas			
Slate, 0' 0 1/4" to.....0 0 } 2' 2".....	2	505	125'
Coal, soft, columnar...0 6 } (1785' B.)			
Shale and concealed.....	10	515	
Shale	15	530	
Concealed	25	555	
Sandstone	5	560	
Concealed	5	565	
Coal, laeger "B", 0' 6"	0	565	60'

	Thickness Feet.	Total Feet.
Fire clay and concealed.....	5	570
Shale	5	575
Concealed	5	580
Sandstone, massive.....	25	605
Concealed, shale, and concealed.....	40	645
Sandstone and concealed.....	5	650
Coal blossom, laeger, 0' 10" visible.....	0	650
Shale and concealed.....	30	680
Coal blossom, Lower laeger.....	0	680
Concealed	5	685
Sandstone, shaly.....	10	695
Concealed to Bradshaw Creek.....	70	765

Three and a half miles northwestward in the extreme southwest edge of the same district, the following section was measured with aneroid by the writer northward from the summit of a high knob on the McDowell-Buchanan County Line, 1.2 miles southwest of the junction of North and South Forks of Slauch Fork. That portion above the base of the Upper Gilbert Sandstone was determined along the State Line in the direction of the dip of the rocks, so that its intervals are greater than they should be. That, below the same member, was measured along the trail leading down to the latter stream, $\frac{3}{4}$ mile below the mouth of South Fork, roughly along the strike:

Section 2½ Miles N. W. of Paynesville, Sandy River District.

Pennsylvanian (775')	Thickness Feet.	Total Feet.
Kanawha Group (400')		
Coal blossom, Bens Creek? (2220' B.).....	0	0
Sandstone, soft, massive, friable, from top of knob.....	55	55
Concealed	10	65
Coal, (6"), (2165' B.), Little Eagle?.....	0	65
Shale, buff.....	20	85
Concealed	30	115
Sandstone, soft, friable, coarse, reddish, Grapevine	75	190
Shale, buff.....	40	230
Sandstone	5	235
Shale, buff, sandy.....	35	270
Concealed	45	315
Sandstone, coarse, brown, soft, friable, Upper Gilbert	55	370
Concealed to bench, (horizon of Gilbert Coal)	15	385
Concealed	15	400

New River Group (375')

Concealed, mostly sandstone.....	100	500	
Concealed and shale.....	25	525	
Sandstone, massive.....	15	540	
Concealed	214	754	
Shale, bluish gray, sandy.....	3	757	
Coal, opening closed, (reported 3'), Lower			
Douglas (1460' B.).....	3	760	360'
Sandstone, massive, Panther , to bed of			
Slaunch Fork	15	775	15'

Browns Creek District.

Browns Creek District, lying immediately to the east of that last discussed and along the north central border of McDowell County, is in the region of outcropping rocks of the New River and Pocahontas Groups exclusively, with the exception of a few isolated areas of the Kanawha, capping the summits of the highest hills along the Huff Creek District Line and totaling slightly less than one square mile in areal extent. In the western portion of the district, the following succession is obtained by combining an aneroid section measured down the south hillside of Tug Fork, 0.1 mile below the mouth of Cub Branch, with the log of a diamond drill boring (53 on Map II). The latter is located on the north edge of the public road where it crosses Jenny Branch and was completed in September, 1913, by Geo. F. Lasher, the authority for the record being W. R. Graham, of Bluefield, West Virginia:

Cub Branch—Pando Section, Browns Creek District.

Pennsylvanian (1354')	Thickness	Total
New River Group (1026')	Ft. In.	Ft. In.
Concealed from top of knob.....	30 0	30 0
Concealed, mostly shale.....	35 0	65 0
Sandstone, medium grained, brown and yellowish, Upper laeger	30 0	95 0
Concealed, mostly shale.....	75 0	170 0
Sandstone, yellowish brown, medium grained to coarse, Harvey	55 0	225 0
Shale and concealed, mostly dark sandy shale, Sandy Huff	70 0	295 0
Sandstone, platy, making cliff, Guyandot	70 0	365 0
Concealed	15 0	380 0
Shale, dark gray.....	5 0	385 0

Concealed, mostly sandstone.....	45	0	430	0	
Shale, dark, sandy and flaggy, laminated	16	0	446	0	
Coal, bony....0' 2" }					
Coal, soft.....1 4 }					
Coal and shale 0 5 }					
Coal, soft.....1 10 }					
Shale, gray....0 2 }					
Coal, soft.....0 2 }					
Concealed, mostly fire clay and sandstone	50	0	500	0	
Sandstone, platy, Welch	22	0	522	0	
Coal, soft.....0' 11" }					
Bone, cannelly...0 3 }					
Coal, soft.....1 10 }					
Fire clay shale and concealed.....	10	0	535	0	
Concealed, bench between cliffs.....	90	0	625	0	
Sandstone, platy, current bedded, forms great cliff, Lower Raleigh ..	80	0	705	0	180' 0"
Coal blossom, Beckley , and concealed	25	0	730	0	
Sandstone, grayish brown, medium grained, Quinnimont	45	0	775	0	70' 0"
(Continued with the Log of Coal Test Boring No. 53 on Map II, elevation, 1265' B.):					
Sandstone, hard, Quinnimont	75	0	850	0	
Sandstone, light gray and hard, Pineville	137	0	987	0	
Shale	3	0	990	0	
Sandstone, light gray.....	13	0	1003	0	
Slate, black.....	11	0	1014	0	
Shale, sandy.....	12	0	1026	0	
Pocahontas Group (328')					
Sandstone, light gray and hard, Flat-top Mountain	35	0	1061	0	
Shale, black, Rift	27	0	1088	0	
Coal, No. 7 Pocahontas	0	6	1088	6	313' 6"
Slate, black.....	8	6	1097	0	
Shale, dark, sandy.....	19	0	1116	0	
Sandstone, light gray, Pierpont	10	0	1126	0	
Shale, dark, sandy.....	5	0	1131	0	
Sandstone, light gray, very hard, Eckman	102	0	1233	0	
Shale, black.....	14	6	1247	6	
Coal ....0' 4" }					
Shale ...0 8 }					
Coal ...1 5 }					
Shale, dark.....	20	1	1270	0	
Sandstone, light gray, Upper Pocahontas	26	0	1296	0	
Slate, black.....	12	0	1308	0	
Slate, dark, streaked with coal.....	0	6	1308	6	
Shale, dark.....	4	0	1312	6	



PLATE VII(a)—Showing typical Wyoming County clearing, on south hillside of Clear Fork, 0.1 mile south of Oceana (see "Forests" in Chapter XI).



PLATE VII(b)—Showing topography of Kanawha and New River Groups, Lower Nuttall Sandstone at left margin, looking up Guyandot River from point 0.6 mile northwest of mouth of Long Branch.

	Thickness Ft. In.	Total Ft. In.	
Coal .....1' 4" }			
Slate .....0 2 }			
Coal .....0 6 }			
Slate .....4 0 }	No. 3 Pocahontas.. 7 11	1320 5	70' 6"
Coal .....0 8 }			
Slate, black 0 9 }			
Coal .....0 6 }			
Slate, dark.....	17 7	1338 0	
Shale, dark gray.....	7 0	1345 0	
Shale, gray, sandy, to bottom.....	9 0	1354 0	33' 7"

The following succession is obtained near the center of Browns Creek District by combining an aneroid section measured by the writer northwestward down the south hillside of Elkhorn Creek at Welch, with the log of a diamond drill boring (61 on Map II). The latter is located on the east bank of Tug Fork, one-eighth mile south of the mouth of the former stream, and was drilled by the Morrow Prospecting Co., the authority for the record being H. N. Eavenson, of Gary:.

Welch Section, Browns Creek District.

Pennsylvanian (1070' 3")	Thickness Ft. In.	Total Ft. In.	
New River Group (805' 1")			
Concealed and shale from top of knob	40 0	40 0	
Sandstone, Guyandot , mostly concealed			
in steep bluff.....	65 0	105 0	
Concealed along bench.....	5 0	110 0	
Concealed in steep bluff, mostly sandstone	40 0	150 0	
Concealed along bench.....	5 0	155 0	
Sandstone, Lower Guyandot , concealed and slate.....	42 6	197 6	
Coal, opening closed, (reported 2' 6")			
Sewell , (1860' B.).....	2 6	200 0	200' 0"
Concealed and steep bluff, mostly sandstone, Welch	50 0	250 0	
Shale, sandy and buff.....	12 0	262 0	
Coal, soft....0' 10" } Welch			
Bony canal..0 3 }	(2' 10")..... 3 0	265 0	65' 0"
Coal, soft....1 9 }			
(1795' B.)			
Slate and concealed.....	10 0	275 0	
Sandstone, great cliff, partly concealed, Upper Raleigh	90 0	365 0	
Bench, slight.....	5 0	370 0	
Sandstone, making great cliff, Lower Raleigh	90 0	460 0	195' 0"
Concealed and shale.....	158 0	618 0	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Coal, soft (1' 10"), Little Fire Creek, (1440' B.).....	2	0	620	0	160' 0"
Concealed	25	0	645	0	
Sandstone	5	0	650	0	
Shale, sandy, flaggy.....	25	0	675	0	
Concealed to N. & W. Ry. grade at Welch Station.....	95	0	770	0	150' 0"
(Continued with the Log of Coal Test Boring No. 61 on Map II, ele- vation, 1295' L.):					
Surface	3	6	773	6	
Sandstone	28	2	801	8	
Coal .....0' 2" } No. 8 Pocahontas					
Sandstone .2 0 } (1260' L.).....	3	5	805	1	35' 1"
Coal .....0 4 }					
Sandstone. 0 7 }					
Coal .....0 4 }					
Pocahontas Group (265' 2")					
Slate, sandy, Flattop Mountain Sand- stone horizon.....	33	9	838	10	
Coal, No. 7 Pocahontas.....	0	7	839	5	34' 4"
Rock, dark.....	10	3	849	8	
Sandstone, white, Pierpont.....	70	10	920	6	
Coal, mixed with rock.....	26	4	946	10	107' 5"
Sandstone, white..21 ' } Eckman					
Slate .....2 } Sandstone	49	6	996	4	
Sandstone, white..26.5 }					
Slate, sandy.....	4	6	1000	10	
Sandstone, white.....	2	4	1003	2	
Coal .....0' 11½" } No. 4 Pocahontas					
Bone coal..0 5 } (1056.5' L.)...	5	4½	1008	6½	61' 8½"
Coal .....4 0 }					
Fire clay, black.....	0	5½	1009	0	
Fire clay, sandy.....	3	6	1012	6	
Sandstone and slate.....	2	0	1014	6	
Slate, sandy.....	9	3	1023	9	
Rock, streaked.....	6	6	1030	3	
Slate, sandy.....	2	0	1032	3	
Slate, soft.....	2	0	1034	3	
Slate, dark.....	14	9	1049	0	
Rock, dark.....	4	7	1053	7	
Coal, No. 3 Pocahontas "Rider".....	1	4	1054	11	46' 4½"
Sandstone, fine.....	6	6	1061	5	
Rock and slate, mixed.....	2	1	1063	7	
Slate, soft.....	1	3	1064	10	
Coal, No. 3 Pocahontas (994.75' L.)..	5	5	1070	3	15' 4"

Eight miles eastward in the same district, the following section was measured with aneroid by the writer southwestward from the summit of a high knob to the N. & W. Ry. grade at Keystone Station:

Keystone Section, Browns Creek District.

Pennsylvanian (855')	Thickness	Total	
New River Group (365')	Feet.	Feet.	
Sandstone, hard, grayish white, cliff, capping knob, Lower Raleigh	80	80	
Slate, black, and concealed.....	20	100	
Concealed on bench.....	10	110	110'
Sandstone, buff, flaggy, making cliff, Quinnimont	60	170	
Concealed	15	185	
Concealed on bench.....	10	195	85'
Sandstone .....45' }			
Concealed on bench..... 5 }			
Sandstone, coarse, brown.30 }	80	275	
Concealed	15	290	
Concealed on bench (No. 9 Pocahontas horizon)	10	300	105'
Sandstone	25	325	
Concealed	40	365	65'
Pocahontas Group (490')			
Sandstone	5	370	
Concealed, mostly sandy shale.....	68	438	
Sandstone	2	440	
Concealed on bench (No. 7 Pocahontas)....	5	445	80'
Sandstone, flaggy, buff, medium grained, Pierpont	40	485	
Concealed in bench.....	5	490	
Sandstone, platy, buff, medium grained....	45	535	
Concealed	5	540	
Sandstone	25	565	
Concealed	10	575	
Sandstone, buff, making cliff, Eckman	45	620	
Concealed and shale (1870' B.).....	10	630	185'
Sandstone, platy bottom, shaly top, Upper Pocahontas	50	680	
Concealed	17	697	
Coal, No. 3 Pocahontas (3' visible) (1800' B.)	3	700	70
Shale, concealed, and shale.....	26	726	
Sandstone, shaly.....	4	730	
Shale, sandy.....	5	735	
Sandstone, massive, Lower Pocahontas	10	745	
Concealed	20	765	
Sandstone, flaggy, Vivian	25	790	
Concealed	9	799	
Sandstone, flaggy, Landgraff	6	805	
Concealed	15	820	
Sandstone, micaceous, buff, medium grained, Keystone	27.5	847.5	
Shale	2.5	850	
Coal, (0' 3''), Keystone, (1650' B.)	0	850	150'
Shale, gray, to N. & W. Ry. grade.....	5	855	5'

Big Creek District.

Big Creek District, McDowell, lying in the southern point of the county, along the Virginia State Line, is in the region of the outcrop of both the Pennsylvanian and the Mississippian rocks, the latter consisting of five detached areas along the crest of the Dry Fork Anticline and totaling less than 6 square miles.

In the northern edge of the district, the following succession, with the exception of the changes in correlation and additions in parentheses, is as published on pages 126 and 127 of Volume II(A) of the State Survey Reports. As mentioned in the latter Volume, the results were obtained by combining a carefully determined spirit-level section by H. N. Eavenson, of Gary, W. Va., eastward from the summit of a high knob to the top of the U. S. Coal & Coke Co. Boring No. 40—No. 75 on Map II—with the detailed log of the latter. Adjustments for dip were made by Mr. Eavenson, so that the section as it stands represents true vertical measurements. The section is important, in that the true positions of the Iaeger and Sewell "B" Coals are exhibited:

Section 1.4 Miles Northeast of Coalwood, Big Creek District.

Pennsylvanian (1625' 4")	Thickness	Total
New River Group (985' 6")	Ft. In.	Ft. In.
Top of mountain, elevation, 2271.9' L.		
Unrecorded and slate.....	74 0	74 0
Coal, (Iaeger), (2176.8' L.).....	1 3	75 3
Slate and unrecorded.....	160 2	235 5
Coal, (Castle), (2015.2' L.).....	1 5	236 10
Slate and unrecorded and slate.....	124 0	360 10
Coal ....0' 3 " } (Sewell "B")		
Slate ....0 6½ } (1883' L.).....	2 11½	363 9½
Coal ....2 2 }		
Slate, unrecorded and slate.....	92 7	456 4½
Coal ....0' 6 " }		
Slate ....0 7½ } Sewell, "Davy",		
Coal ....1 3 } "Tug River"....	4 1½	460 6
Slate ....0 3 } (1791.5' L.)		
Coal ....1 6 }		
Slate, unrecorded, and sandstone.....	99 8	560 2
Welch, "Lambert,"		
Coal ....3' 5 " } Mined by Virginia-		
Slate ....0 0½ } Pocahontas Coal Co.	3 10½	564 0½
Coal ....0 5 }	(1688.0' L.)	

	Thickness Ft. In.	Total Ft. In.
Slate and unrecorded to top of Bore Hole No. 40....52' 5½"		
(Continued with the Log of the Coal Test Boring No. 75 on Map II, 1635.5' L.):		
Sandy clay.....14 0		
Sandstone, soft.....18 8		
Coal, Little Raleigh, "Snake Root," 1600.8' L.....	2 1	651 3
Sandstone, slaty.....	11 3	662 6
Sandstone, soft.....24' 0"		
Slate, sandy.....23 0		
Slate 7 0		
Sandstone .....36 6		
Coal, "War Creek," Beckley (1493.4' L.)	5 8	758 8
Slate	5 0	763 8
Coal	0 7	764 3
Sandstone, slaty.....	9 3	773 6
Sandstone, hard, (Quinnimont).....	19 7	793 1
Coal, (Fire Creek), (1457.7').....	1 3	794 4
Slate	4 2	798 6
Sandstone	30 0	828 6
Slate	9 0	837 6
Sandstone, slaty.....	30 5	867 11
Coal, (Little Fire Creek), (1381.8' L.)	2 4	870 3
Slate, sandy.....	15 3	885 6
Sandstone, (Pineville).....	57 9	943 3
Coal, (No. 9 Pocahontas), (1307.1' L.)	0 8	943 11
Sandstone	33 7	977 6
Slate	7 4	984 10
Coal, (No. 8 Pocahontas), (1265.5' L.)	0 8	985 6
Pocahontas Group (639' 10")		
Sandstone .....20' } Flattop Mountain	43 0	1028 6
Sandstone, slaty.23' }		
Slate, sandy.....	10 0	1038 6
Sandstone, (Pierpont).....	62 0	1100 6
Slate	25 0	1125 6
Sandstone	12 0	1137 6
Sandstone, broken.....	16 0	1153 6
Sandstone, (Eckman).....	106 0	1259 6
Slate	15 3	1274 9
Coal, No. 4 Pocahontas, (975.6' L.)....	0 9	1275 6
Sandstone, (Upper Pocahontas).....	8 0	1283 6
Slate	26 0	1309 6
Sandstone, slaty, (Upper Pocahontas).	9 0	1318 6
Slate	15 6	1334 0
Coal, No. 3 Pocahontas, (916.3' L.)....	0 9	1334 9
Slate	24 9	1359 6
Sandstone .....16' }		
Conglomerate ... 4 }		
Sandstone .....19 }		
(Lower Pocahontas)....	39 0	1398 6

	Thickness Ft. In.	Total Ft. In.
Slate	17 0	1415 6
Sandstone, (Vivian).....	30 0	1445 6
Slate	18 0	1463 6
Sandstone, hard, (Landgraff), to bot- tom of hole, at 765.5' L.....	22 0	1485 6
Interval estimated to top of Mauch Chunk Red Shale, or base of Pottsville	139 10	1625 4

"This boring begins only a few (52') feet below the level of the Welch or Hemphill Coal, and as it was drilled below No. 3 Pocahontas, it passes through most of the New River and Pocahontas Coal Groups. To add to the completeness of the section here, Mr. Eavenson had all of the coals opened up in the high knob which rises to an elevation of 636.4' above the level of the bore hole, thus giving a very long and complete section of the Middle and Lower Pottsville in this region by the addition of the known interval below the bottom of the record, down to the top of the Mauch Chunk Red Beds, as determined near Welch at the boring on Browns Creek by the Pocahontas Coal and Coke Company, and published on page 694, Vol. II, W. Va. Geological Survey."

Slightly northwest of the center of the same district and $\frac{3}{4}$ mile below the mouth of Barrenshe Creek, the writer measured the following section with aneroid northward down the south hillside of Dry Fork along a deep ravine via the Dry Fork Colliery Company mine opening. It is interesting in that the Harvey Conglomerate has its characteristic features of Raleigh County, as described by M. R. Campbell in the Raleigh Folio of the U. S. G. Survey:

Dry Fork Station Section, Big Creek District.

Pennsylvanian (982')	Thickness Feet.	Total Feet.
New River Group (982')		
Unrecorded (estimated from topographic map) from top of mountain.....	300	300
Concealed	115	415
Sandstone, Harvey Conglomerate, platy, with large quartz pebbles 1" to 1½" in diameter, medium grained bottom, coarse top.....	20	435
Concealed	10	445
Shale, dark, variegated...10' }		
Concealed .....30 }		
Shale, dark, variegated...20 }		
Concealed	10	515
	60	505
	Sandy Huff..	

100 1012390

	Thickness Feet.	Total Feet.	
Sandstone, hard, buff and light gray, cur- rent bedded.....35	Guyandot Sandstone	85	600
Concealed .....20			
Sandstone, massive and gray .....10			
Slate, black, sandy.... 0 1/3			
Sandstone, massive, fine grained .....19 1/2			
Shale	3	603	
Concealed	1.5	604.5	
Coal, visible..1' 0" } Sewell "B" (2' 5")....	2.5	607	172'
Shale, gray....0 5 } (1675' B.)			
Coal, slaty....1 0 }			
Fire clay shale, sandy.....	3	610	
Sandstone, massive.....	10	620	
Concealed	30	650	
Shale, dark, hard, flaggy, plant fossils.....	22	672	
Coal, (0' 5"), Sewell "A".....	0	672	65'
Shale, bluish gray, sandy.....	5	677	
Sandstone, Lower Guyandot.....	15	692	
Concealed (holding Sewell Coal horizon)...	15	707	35'
Sandstone, platy, current bedded, buff and grayish brown, micaceous, medium grained, Welch.....	60	767	
Concealed (holding Welch Coal horizon)...	13	780	73'
Shale, hard, sandy, dark.....	30	810	
Sandstone, flaggy bottom, massive at top, Upper Raleigh.....	22	832	
Shale and concealed.....	3	835	
Coal, (2' 0"), Little Raleigh (1445' B.).....	2	837	57'
Shale and concealed.....	23	860	
Shale, flaggy, hard, drab.....	57	917	
Concealed	15	932	
Sandstone, medium grained, buff and brown, Lower Raleigh.....	46	978	
Coal, Beckley (4' 0"), (1300' B.).....	4	982	145'

Three miles almost due eastward the following succession is obtained by combining a section measured with aneroid by Gawthrop down the east hillside of a branch of Big Creek, with the log of a diamond drill boring. The latter is located 1.2 miles due north of the mouth of Jacob Fork, and was drilled by the New River & Pocahontas Consolidated Coal Co., the authority for the record being H. N. Eavenson, of Gary, W. Va.:

Section 1.2 Miles North of Mouth of Jacob Fork, Big Creek District.

Pennsylvanian (1219')	Thickness	Total	
New River Group (820')	Ft. In.	Ft. In.	
Concealed, with sandstone from top of point	85 0	85 0	
Concealed, with shale.....	25 0	110 0	
Shale, silicious, gray.....	10 0	120 0	
Concealed	50 0	170 0	
Shale, gray, silicious.....	5 0	175 0	
Concealed	60 0	235 0	
Sandstone	5 0	240 0	
Concealed	70 0	310 0	
Sandstone, massive.....	5 0	315 0	
Concealed	5 0	320 0	
Coal, rotten, (visible 1' 2"), Welch, (1950' B.).....	.. .	320 0	320' 0"
Sandstone, massive...15' } Upper			
Concealed .....10 } Raleigh.	50 0	370 0	
Sandstone, massive...25 }			
Concealed	75 0	445 0	
Sandstone, massive, Lower Raleigh...	10 0	455 0	
Concealed	80 0	535 0	
Coal, prospect closed, Beckley, thickness concealed.....	.. .	535 0	215' 0"
Concealed	5 0	540 0	
Sandstone, flaggy, Quinnimont.....	10 0	550 0	
Concealed to top of boring (120).....	20 0	570 0	35' 0"
(Continued with the Log of Coal Test Boring No. 120 on Map II, 1703'L.):			
Surface soil.....	6 0	576 0	
Sandstone	19 0	595 0	
Slate, dark.....	2 0	597 0	
Sandstone	97 0	694 0	
Shale, dark.....	10 0	704 0	
Coal, Fire Creek.....	2 0	706 0	136' 0"
Shale, dark.....	1 0	707 0	
Sandstone	38 0	745 0	
Coal, Little Fire Creek.....	0 6	745 6	39' 6"
Shale, dark.....	11 6	757 0	
Sandstone	7 0	764 0	
Coal	0 6	764 6	19' 0"
Shale, dark.....	1 6	766 0	
Unrecorded	23 0	789 0	
Coal, No. 9 Pocahontas.....	1 0	790 0	25' 6"
Shale, gray.....	30 0	820 0	
Pocahontas Group (399')			
Sandstone, Flattop Mountain.....	40 0	860 0	
Shale, dark.....	27 0	887 0	
Coal, No. 7 Pocahontas.....	0 6	887 6	97' 6"
Shale, dark.....	21 6	909 0	

		Thickness		Total	
		Ft.	In.	Ft.	In.
Sandstone ....20'	} Pierpont Sandstone	56	0	965	0
Shale, dark...16					
Sandstone ....20					
Shale, dark.....		46	0	1011	0
Coal and slate.0' 6"	} No. 6 Pocahontas	2	0	1013	0
Shale, gray....1 0					
Coal .....0 6					
	Upper Bench				125' 6"
Slate, dark.....		5	0	1018	0
Shale and fire clay.....		8	6	1026	6
Coal		0	8	1027	2
Shale, dark.....		0	9	1027	11
Coal		0	7	1028	6
Shale, dark.....		0	6	1029	0
Sandstone		5	6	1034	6
Shale, dark.....		2	0	1036	6
Coal ....1' 2"	} No. 6 Pocahontas....	2	4	1038	10
Shale ...1 0					
Coal ....0 2					
Shale and fire clay.....		1	8	1040	6
Shale, sandy.....		20	6	1061	0
Sandstone, hard.....		6	6	1067	6
Shale and soapstone.....		4	6	1072	0
Coal		0	3	1072	3
Shale and soapstone.....		1	6	1073	9
Shale, dark, sandy.....		40	9	1114	6
Shale and soapstone.....		3	6	1118	0
Slate, dark.....		1	6	1119	6
Coal, No. 5 Pocahontas.....		0	6	1120	0
Shale, sandy.....		4	0	1124	0
Sandstone		21	6	1145	6
Shale, dark		4	0	1149	6
Coal, No. 4 Pocahontas.....		0	6	1150	0
Shale, dark.....		2	6	1152	6
Shale, sandy.....		31	0	1183	6
Shale and soapstone.....		15	9	1199	3
Coal, No. 3 Pocahontas, (1070' L.).....		3	9¼	1203	0¼
Shale and fire clay.....		1	11¾	1205	0
Shale, dark, to bottom.....		14	0	1219	0

The following succession is obtained about 3 miles eastward in the same district by combining another section measured by Gawthrop with aneroid northeastward down the west hillside of Big Creek, opposite the mouth of Long Branch, with the log of a diamond drill boring, No. 50 of the U. S. Coal & Coke Co. (No. 126 on Map II). The latter is also located at the mouth of the stream last mentioned, the authority for its record being H. N. Eavenson of Gary, W. Va.:

Long Branch Section, Big Creek District.

Pennsylvanian (984')	Thickness	Total	
New River Group (490')	Ft. In.	Ft. In.	
Concealed, with sandstone, from top of knob.....	50 0	50 0	
Sandstone	15 0	65 0	
Concealed	60 0	125 0	
Sandstone, flaggy.....	10 0	135 0	
Concealed	50 0	185 0	
Sandstone, massive.....	10 0	195 0	
Sandstone, flaggy.....	10 0	205 0	
Concealed	15 0	220 0	
Sandstone, massive.....	20 0	240 0	
Concealed	10 0	250 0	
Sandstone, flaggy.....	10 0	260 0	
Concealed	70 0	330 0	
Sandstone, shaly.....	10 0	340 0	
Concealed	60 0	400 0	
Sandstone	10 0	410 0	
Concealed	25 0	435 0	
Concealed on bench.....	10 0	445 0	
Concealed	45 0	490 0	
Pocahontas Group (494')			
Sandstone, flaggy, Flattop Mountain..	15 0	505 0	
Concealed	10 0	515 0	
Sandstone, massive.....	15 0	530 0	
Concealed	55 0	585 0	
Sandstone, flaggy.....15' }			
Sandstone, massive, { Pierpont... 45 0		630 0	
gray, hard, caps			
spur .....30' }			
Concealed	15 0	645 0	
Sandstone, massive.....	50 0	695 0	
Concealed, mostly sandstone.....	15 0	710 0	
Sandstone, flaggy.....	10 0	720 0	
Concealed to top of boring (126) (1565' L.).....	10 0	730 0	730' 0"
(Continued with the Log of Coal Test Boring No. 126 on Map II):			
Sand	8 0	738 0	
Slate	32 0	770 0	
Coal, No. 4 Pocahontas.....	3 6	773 6	43' 6"
Slate	89 0	862 6	
Coal, No. 3 Pocahontas (1427' L.)....	5 6	868 0	94' 6"
Slate	5 0	873 0	
Sandstone, Lower Pocahontas.....	68 0	941 0	
Slate	8 0	949 0	
Sandstone, Vivian, to bottom.....	35 0	984 0	116' 0"

The following section was measured with aneroid by Gawthrop southeastward closely along the axis of the Dry Fork Anticline down the east hillside of Big Creek, where the latter fold has elevated the Mississippian Rocks above drainage:

Section 1 Mile Northwest of Squire Jim, Big Creek District.

Pennsylvanian (430')	Thickness	Total
Pocahontas Group (430')	Feet.	Feet
Concealed from top of knob.....	50	50
Sandstone, massive, gray, coarse.....	20	70
Concealed, with sandstone.....	10	80
Sandstone, massive, gray, coarse, micaceous	15	95
Concealed, mostly sandstone.....	20	115
Concealed	105	220
Sandstone, massive, gray, micaceous.....	10	230
Concealed	80	310
Concealed on bench.....	10	320
Concealed	10	330
Sandstone, massive, brownish gray, coarse grained, micaceous.....	50	380
Concealed, mostly sandstone.....	25	405
Sandstone, grayish brown, fine grained, mi- caceous	10	415
Concealed, with gray shale.....	15	430
Mississippian (470')		
Mauch Chunk Series (470')		
Shale, reddish brown, top of Mauch Chunk Shale, elevation, top, 2175' B.....	5	435
Concealed	95	530
Concealed on bench.....	10	540
Concealed, with shale and sandstone.....	40	580
Sandstone, massive, fine grained, mica- ceous, slaty, gray.....	5	585
Concealed	120	705
Sandstone, gray, massive, fine grained....	5	710
Shale, gray.....	5	715
Concealed	90	805
Shale, gray.....	10	815
Concealed	5	820
Sandstone, shaly, flaggy.....	10	830
Shale, brownish gray, silicious.....	25	855
Concealed	10	865
Shale, red.....	10	875
Concealed to bed of Big Creek at mouth of run.....	25	900

The following succession is obtained near the center of the same district by combining a section measured with aneroid by the writer southwestward from the summit of a knob, 1 mile northeast of Berwind down the north hillside of Big Branch, with the log of a diamond drill boring (114). The latter is located on Big Branch, 100 to 300 feet above its mouth, and was drilled by the New River and Pocahontas Consolidated Coal Co., the authority for the record being H. N. Eavenson, of Gary, W. Va.:

Section $\frac{1}{2}$ Mile Northeast of Berwind, Big Creek District.

Pennsylvanian (1152')	Thickness	Total	
New River and Pocahontas Groups (1152')	Ft. In.	Ft. In.	
Concealed, with coarse brown sandstone, from top of knob, elevation, 2325' B.....	50 0	50 0	
Concealed in steep slope.....	85 0	135 0	
Concealed in bench.....	15 0	150 0	
Concealed	50 0	200 0	
Concealed in bench.....	25 0	225 0	
Concealed in slope, mostly hard buff sandy shale.....	75 0	300 0	
Concealed in bench.....	20 0	320 0	
Sandstone, massive, coarse, brown....	40 0	360 0	
Concealed and shale.....	10 0	370 0	
Sandstone, Lower Raleigh? coarse, massive, yellowish brown at bottom, platy, buff, medium grained at top.....	40 0	410 0	
Concealed	5 0	415 0	
Slate, black.....	0 0	415 0	
Sandstone, platy, brown, medium grained	45 0	460 0	
Concealed, steep bluff.....	10 0	470 0	
Sandstone, platy bottom, massive top, medium grained, brown and gray.	30 0	500 0	
Concealed and shale.....	35 0	535 0	
Sandstone, platy bottom, massive top, medium grained.....	40 0	575 0	
Concealed and shale.....	45 0	620 0	
Sandstone, platy, medium grained, gray and brown.....	10 0	630 0	
Concealed	25 0	655 0	
Sandstone, flaggy.....	5 0	660 0	
Concealed	15 0	675 0	
Sandstone, platy, medium grained, hard, gray and brown.....	50 0	725 0	
Concealed to top of Coal Test Boring (114).....	120 0	845 0	
(Continued with Log of Coal Test Boring No. 114 on Map II, 1480.03' L.):			
Surface soil.....	16 0	861 0	
Sandstone	3 0	864 0	
Coal (No. 7 Pocahontas).....	0 10	864 10	19' 10"
Fire clay.....	2 6	867 4	
Shale, dark.....	24 0	891 4	
Sandstone	7 0	898 4	
Coal (No. 6 Pocahontas).....	1 0	899 4	34' 6"
Fire clay.....	4 0	903 4	
Shale, dark.....	50 0	953 4	
Fire clay, shaly.....	3 0	956 4	
Coal, (No. 5 Pocahontas).....	0 5	956 9	57' 5"
Fire clay.....	1 0	957 9	

	Thickness	Total	
	Ft. In.	Ft. In.	
Shale, light, sandy.....	6 0	963 9	
Sandstone	19 0	982 9	
Fire clay.....	4 0	986 9	
Shale, light, sandy.....	7 0	993 9	
Fire clay, slaty.....	8 3	1002 0	
Shale, light, sandy.....	12 0	1014 0	
Fire clay.....	4 0	1018 0	
Sandstone, Upper Pocahontas	33 0	1051 0	
Shale, dark.....	7 0	1058 0	
Coal, No. 3 Pocahontas (1264.03' L.)...	3 0	1061 0	104' 3"
Fire clay.....	3 0	1064 0	
Sandstone, Lower Pocahontas	37 0	1101 0	
Shale, dark.....	6 0	1107 0	
Sandstone	7 0	1114 0	
Shale, dark.....	5 6	1119 6	
Coal (No. 2 Pocahontas)	0 3	1119 9	58' 9"
Fire clay.....	4 0	1123 9	
Shale, dark.....	7 0	1130 9	
Coal, (No. 1 Pocahontas)	0 4	1131 1	11' 4"
Fire clay.....	5 11	1137 0	
Shale, light, to bottom.....	15 0	1152 0	

In the southwest edge of the same district, the following succession is obtained by combining a section measured with aneroid by the writer northward along the second class road, 2½ miles southwest of the mouth of Vall Creek, with the log of a diamond drill boring (103). The latter is located on a branch of the same stream, 2.2 miles west of Hartwell and was drilled by the New River and Pocahontas Consolidated Coal Co., the authority for the record being H. N. Eavenson, of Gary, W. Va.:

Vall Creek (Head of) Section, Big Creek District.

Pennsylvanian (1203' 1")	Thickness	Total	
New River Group (800')	Ft. In.	Ft. In.	
Concealed and shale.....			
Shale, buff, coarse.....	60 0	60 0	
Concealed	5 0	65 0	
Shale, buff.....	20 0	85 0	
Slate, black, carbonaceous (0' 3")...	0 0	85 0	
Fire clay and concealed.....	60 0	145 0	
Concealed in ridge.....	50 0	195 0	
Concealed to trail forks.....	35 0	230 0	
Sandstone, coarse, brown.....	25 0	255 0	
Concealed	15 0	270 0	270' 0"
Sandstone, massive, brown, Welch? ...	65 0	335 0	
Concealed	85 0	420 0	

	Thickness Ft. In.	Total Ft. In.	
Sandstone, making cliff, Lower Raleigh?	60 0	480 0	
Concealed	170 0	650 0	
Shale, buff, sandy.....	20 0	670 0	
Concealed	30 0	700 0	
Sandstone	20 0	720 0	
Concealed	80 0	800 0	530' 0"
Pocahontas Group (403' 1")			
Concealed to top of boring (103) (1887' L.).....	75 0	875 0	
(Continued with Log of Coal Test Boring No. 103 on Map II):			
Surface soil.....	25 0	900 0	
Shale, dark.....	20 0	920 0	
Fire clay.....	2 0	922 0	
Shale, dark, sandy.....	18 0	940 0	
Sandstone, Pierpont	32 0	972 0	
Shale, dark.....	9 6	981 6	
Coal .....1' 0" }			
Fire clay...2 0 }			
Shale, dark, sandy .9 0 }			
Coal .....0 5 }			
No. 6 Pocahontas.	12 5	993 11	193' 11"
Fire clay, sandy.....	1 1	995 0	
Sandstone	6 0	1001 0	
Soapstone	5 0	1006 0	
Shale, dark, sandy.....	49 0	1055 0	
Slate, black.....	6 0	1061 0	
Shale, dark, sandy.....	10 0	1071 0	
Sandstone, Eckman	45 0	1116 0	
Shale, dark.....	0 2	1116 2	
Coal, No. 5 Pocahontas.	0 5	1116 7	122' 8"
Shale, dark, sandy.....	0 7	1117 2	
Coal, bony	0 7	1117 9	
Fire clay, sandy.....	2 0	1119 9	
Sandstone	5 3	1125 0	
Coal, No. 4 Pocahontas.	0 8	1125 8	9' 1"
Fire clay.....	1 4	1127 0	
Sandstone, Upper Pocahontas	61 0	1188 0	
Soapstone	1 0	1189 0	
Sandstone	3 0	1192 0	
Coal .....2' 0 " }			
Bone .....0 1 }			
No. 3 Pocahontas	3 2½	1195 2½	69' 6½"
Coal .....1 1½ }			
(1566.9' L.)			
Shale, sandy, to bottom.....	7 10½	1203 1	

Two miles northwestward in the same district, the following succession is obtained by combining a section measured with aneroid by the writer from the summit of a knob on the State Line, northeastward along a trail leading down Keewee Creek, with the log of a diamond drill boring (97). The latter is located near the head of the same stream and

was drilled by the New River and Pocahontas Consolidated Coal Co., the authority for the record being H. N. Eavenson, of Gary, West Virginia:

**Section 2 Miles East of Bearwallow Knob,
Big Creek District.**

Pennsylvanian (1978')	Thickness		Total	
New River Group (1544' 4")	Ft. In.		Ft. In.	
Sandstone, massive, brown, with quartz pebbles, flat and round, some 1½" in diameter, from top of knob.....65'	Panther	105 0	105 0	0
Concealed .....30				
Sandstone, coarse, brown, with quartz pebbles...10				
Concealed	5 0	110 0		
Slate, black.....	5 0	115 0		
Concealed	39 0	154 0		
Slate, black.....	1 0	155 0		
Concealed, with shale and sandstone..	70 0	225 0		
Sandstone, massive, brown, medium grained, Upper laeger.....	35 0	260 0		
Concealed, mostly buff shale.....	35 0	285 0		
Sandstone, shaly.....	10 0	295 0		
Shale, buff, sandy.....	30 0	325 0		
Concealed	50 0	375 0		
Coal, blossom, Lower laeger? (2710' B.)	0 0	375 0		375' 0"
Sandstone, buff, fine grained Lower laeger?	35 0	410 0		
Concealed, mostly buff shale.....	55 0	465 0		
Sandstone, flaggy.....	10 0	475 0		
Concealed	30 0	505 0		
Shale, drab.....	20 0	525 0		
Concealed to top of boring (97) at 1955' L.....	605 0	1130 0		755' 0"
(Continued with the Log of Coal Test Boring No. 97 on Map II 1954.9' L.):				
Surface soil.....	16 0	1146 0		
Sandstone, Lower Raleigh.....	33 0	1179 0		
Shale, dark.....	37 0	1216 0		
Slate, black.....	17 0	1233 0		
Shale, dark.....	6 0	1239 0		
Coal, Beckley.....	0 5	1239 5		109' 5"
Fire clay.....	8 0	1247 5		
Sandstone, Quinnimont.....	68 7	1316 0		
Shale, dark.....	3 0	1319 0		
Sandstone	58 0	1377 0		
Shale, dark.....	7 0	1384 0		

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Coal, No. 2 "A" Pocahontas.....	0	3	1915	7	26' 3"
Sandstone, Lower Pocahontas.....	18	0	1933	7	
Shale, dark, sandy	16	0	1949	7	
Sandstone	5	5	1955	0	
Shale, dark.....	1	6	1956	6	
Coal, bony....0' 10" } No. 2 Poca-					
Fire clay shale 0 5 } hontas	1	11	1958	5	42' 10"
Coal, bony....0 8 }					
Fire clay shale	1	7	1960	0	
Sandstone, Vivian, to bottom.....	18	0	1978	0	

In the extreme southeast edge of the same district, the following succession is obtained by combining a section measured with aneroid by Gawthrop down the northwest hillside of Horsepen Creek, with the log of a diamond drill boring, No. 58 of the U. S. Coal & Coke Co. The latter is located 0.4 mile northeast of the mouth of the stream last mentioned, and the record, with slight modifications, is as published on pages 109-110 of Volume II(A) of the State Survey Reports:

Horsepen Creek Section, Big Creek District.

Pennsylvanian (619')		Thickness		Total	
New River Group (205')		Ft.	In.	Ft.	In.
Concealed					
Sandstone, massive	10	0		10	0
Concealed	30	0		40	0
Sandstone, massive, gray	15	0		55	0
Concealed, probably holds Fire Creek Coal	10	0		65	0
Sandstone, massive, brownish gray, forms cliff.....	15	0		80	0
Concealed	90	0		170	0
Sandstone, hard, micaceous, massive, gray, cliff.....	30	0		200	0
Concealed, with sandstone	5	0		205	0
Pocahontas Group (414')					
Sandstone, massive, gray, Flattop Mountain	15	0		220	0
Concealed	105	0		325	0
Sandstone, flaggy, to top of Coal Test Boring (130), elevation 1811' L...	15	0		340	0
Sand	7	0		347	0
Sand and boulders	9	0		356	0
Sandstone, Pierpont	54	0		410	0
Slate, sandy	9	0		419	0
Sandstone	10	0		429	0
Slate	7	5		436	5
Coal, No. 6 Pocahontas	0	11		437	4
					97' 4"

		Thickness	Total	
		Feet.	Feet.	
Slate		0 8	438 0	
Sandstone .....20'	Eckman	38 0	476 0	
Slate 3				
Sandstone, slaty. 5				
Sandstone .....10				
Slate, sandy		18 0	494 0	
Slate		2 10	496 10	
Coal, No. 5 Pocahontas (1648.5' L.)...		5 6	502 4	65' 0"
Slate, sandy		3 8	506 0	
Sandstone		25 0	531 0	
Slate		0 8	531 8	
Coal, slaty....1' 4"	No. 4 Poca- hontas (1610.6' L.)	8 6	540 2	37' 10"
Slate .....2 1				
Coal .....3 9				
Slate .....0 6				
Coal .....0 10				
Slate, sandy		15 11	556 1	
Coal		0 6	556 7	
Slate, sandy		6 5	563 0	
Sandstone, slaty		3 0	566 0	
Sandstone, Upper Pocahontas		37 0	603 0	
Slate		6 3	609 3	
Coal .....5' 3"	No. 3 Poca- hontas	5 9	615 0	
Slate .....0 3				
Coal .....0 3				
Slate, sandy to bottom.....		4 0	619 0	

Adkin District.

Adkin, lying immediately to the east of the District last discussed and in the southeastern border of McDowell County, is in the region of outcropping rocks of both the Pennsylvanian and the Mississippian, the New River and Pocahontas divisions of the former and the Mauch Chunk of the latter being represented. The following section was measured with aneroid by Gawthrop down the southwest hillside of Spice Creek near the point where the latter stream is intersected by the axis of the Dry Fork Anticline, giving the greatest thickness determined for the Mississippian exposures in the territory of this Report:

Spice Creek Section, Adkin District.

Pennsylvanian (445')	Thickness	Total	
Pocahontas Group (445')	Feet.	Feet.	
Concealed from top of point.....	40	40	
Coal prospect (closed, reported 5' 6" with slate parting 1' 10" thick), No. 4 Poca- hontas	5	45	45'

	Thickness Feet.	Total Feet.	
Concealed	60	105	
Coal prospect (closed, reported 4' 8" with slate parting of 0' 3"), No. 3 Pocahontas (2628' L.)	5	110	65'
Concealed	25	135	
Sandstone, massive, gray, coarse, Lower Pocahontas	20	155	
Concealed	20	175	
Sandstone, massive	10	185	
Concealed	25	210	
Concealed to bench	65	275	
Sandstone, massive, gray, medium grained	20	295	
Concealed	40	335	
Shale, gray	10	345	
Concealed	45	390	
Concealed, with sandstone	20	410	
Sandstone, massive, medium grained, brown, micaceous, forms cliff.....	35	445	335'
Mississippian (605')			
Mauch Chunk Series (605')			
Concealed	60	505	
Sandstone, hard, fine grained, greenish gray	5	510	
Concealed	25	535	
Sandstone, flaggy, greenish gray.....	5	540	
Concealed	60	600	
Shale, gray	10	610	
Concealed	150	760	
Sandstone, massive, brownish gray, fine grained, micaceous	10	770	
Concealed, with shale and sandstone.....	90	860	
Sandstone, massive, brownish gray, mica- ceous, fine grained	5	865	
Concealed	15	880	
Sandstone, fine grained, brown, massive...	5	885	
Concealed, with sandstone and shale.....	90	975	
Shale, red.....	10	985	
Concealed, with sandstone and shale to Spice Creek	65	1050	

North Fork District.

North Fork District, lying in the northeastern point of McDowell County, is in the region of outcropping strata of the New River and Pocahontas Groups exclusively. In its northern edge, the following section was measured with aneroid by Gawthrop along the private road leading down the northwest hillside of North Fork to the southwest edge of the town of Burkes Garden (Crumpler P. O.). The intervals are slightly less than they should be, owing to the prevailing northwest dip of the rocks:

Crumpler Section, North Fork District.

Pennsylvanian (550')	Thickness	Total	
New River and Pocahontas Groups (550')	Feet.	Feet.	
Concealed, with sandstone			
Coal opening (closed), Fire Creek (2850' B.)	0	0	
Concealed	10	10	
Sandstone, shaly	10	20	
Concealed	13	33	
Coal blossom, Little Fire Creek.....	2	35	35'
Concealed	25	60	
Coal blossom (visible (0' 8")).....	0	60	25'
Concealed and shale	30	90	
Sandstone, shaly	10	100	
Concealed	105	205	
Coal blossom, No. 7 Pocahontas.....	0	205	145'
Concealed	5	210	
Sandstone, massive, hard, Pierpont.....	10	220	
Concealed, with sandstone	110	330	
Coal prospect (closed, visible 1' 0"),			
No. 6 Pocahontas.....	0	330	125'
Concealed, with shale.....	10	340	
Concealed	30	370	
Sandstone, massive, gray	10	380	
Concealed and shale	116	496	
Coal, No. 3 Pocahontas (2360' B.).....	4	500	170'
Concealed to N. & W. Ry. grade.....	50	550	

Elkhorn District.

Elkhorn, lying immediately south of the last district discussed, is also in the region of outcropping rocks of the New River and Pocahontas Groups exclusively. The following section was measured with aneroid northward along the hill road leading from the low gap at the head of Mill Branch of Tug Fork, to the bed of Elkhorn Creek, $\frac{1}{2}$ mile west of Elkhorn. Owing to the dip of the strata in this direction, the intervals are greater than they should be:

Elkhorn Section, 0.5 Mile West, Elkhorn District.

Pennsylvanian (500')	Thickness	Total
New River Group	Feet.	Feet.
Concealed		
Coal prospect (closed), No. 8 Pocahontas..	0	0
Pocahontas Group (500')		
Sandstone, massive, grayish white and buff,		
Flattop Mountain	60	60
Concealed and shale	15	75
Slate, black, carbonaceous fossil plants....	5	80
Fire clay shale.....	5	85

	Thickness Feet.	Total Feet.	
Sandstone, massive, bluish gray, micaceous, medium grained	30	115	
Concealed	10	125	
Coal blossom, No. 7 Pocahontas	0	125	125
Concealed	5	130	
Sandstone, buff, Pierpont	20	150	
Concealed	35	185	
Sandstone, massive, Eckman , grayish brown, current bedded, medium grained to coarse	45	230	
Concealed	25	255	
Sandstone, bluish gray, Eckman	20	275	
Concealed	50	325	
Sandstone, Upper Pocahontas	32	357	
Shale, buff, sandy	9	366	
Coal , soft.....3' 0" } Coal , gas, hard, { No. 3 Pocahontas slightly bony 0 3 | (8' 9") Coal , soft.....5 6 } (1990' B.)	9	375	250'
Slate and unrecorded to bed of Elkhorn Creek	125	500	125'

SUMMARY.

The following table has been compiled from the sections on preceding pages of this Chapter. It furnishes a convenient reference for the thickness of the stratified rocks which crop or have been penetrated by Coal Test Borings in the territory of this Report, not only of the main divisions of the Carboniferous—Pennsylvanian and Mississippian—but also of their sub-divisions or series. A line of dots under a series indicates that the formation was not exposed or penetrated by boring when the latter is used in the section; and a question mark, that the series was present but could not be separated from the formation either overlying or underlying it. In many instances, thicknesses are either too great or too little, owing to the dip of the strata prevailing at that point. An explanation accompanies each section, giving the peculiar conditions under which it was determined:

Table Showing Thickness in Feet of Stratified Rocks in
Wyoming and McDowell Counties.

Place Measured.	Pennsylvanian.				*Miss.	Total Section.
	Kanawha.	New River.	Pocahontas.	Total.	Mauch Chunk.	
Allen Creek.....		354	408	762	54	816
Avondale, 1 mile South.....	110	1214	433	1757	.....	1757
Bailey Chapel.....		265	505	770	.....	770
Baileysville	300	480	.....	780	.....	780
Bearwallow Knob, 2 miles E..		1544	434	1978	.....	1978
Berwind, ½ mile N. E. of....		?	?	1152	.....	1152
Bradshaw	150	1279	324	1753	.....	1753
Cabin Creek Ridge.....		510	330	840	.....	840
Clarks Gap.....		245	289	534	.....	534
Cedar Creek	720	.....	.....	720	.....	720
Clear Fork Gap	515	295	.....	810	.....	810
Coalwood, 1.4 miles N. E. of..		985	640	1625	.....	1625
Crumpler		?	?	550	.....	550
Cub Branch—Pando.....		1026	328	1354	.....	1354
Douglas Station	810	492	.....	1302	.....	1302
Dry Fork Station.....		982	.....	982	.....	982
Elkhorn		?	500	500	.....	500
Groundhog Branch	210	575	.....	785	.....	785
Harman Branch	200	898	.....	1098	.....	1098
Herndon		345	277	622	.....	622
Hite Fork	65	735	.....	800	.....	800
Horsepen Creek.....		205	414	619	.....	619
Iaeger	45	525	.....	570	.....	570
Jacob Fork.....		820	399	1219	.....	1219
Johnnycake Branch.....		257	.....	257	.....	257
Keystone		365	490	855	.....	855
Little Whiteoak Creek.....		730	626	1356	13	1369
Long Branch.....		490	494	984	.....	984
Longpole, mouth of.....		680	200	880	.....	880
Maben		810	216	1026	.....	1026
Maben, 2 miles S. W. of....		668	254	922	.....	922
Mohawk	700	75	.....	775	.....	775
Mullens		?	?	527	.....	527
Oceana	730	12	.....	742	.....	742
Oceana, 1.3 miles S. E. of....	665	150	.....	815	.....	815
Panther	440	877	.....	1317	.....	1317
Paynesville, 2 mi. N. E. of....	250	515	.....	765	.....	765
Faynesville, 2½ mi. N. W. of..	400	375	.....	775	.....	775
Pineville—Sugar Run.....		842	289	1131	.....	1131
Saulsville, 2 miles N. of.....		565	.....	565	.....	565
Spice Creek.....			445	445	605	1050
Squire Jim, 1 ml. N. W. of..			435	435	465	900
Vall Creek, Head of.....		800	403	1203	.....	1203
Welch		805	265	1070	.....	1070
Whiteoak Creek, Mouth of....		515	320	835	.....	835
Wyoming (Dotson)	532	108	.....	640	.....	640

*Mississippian.

CHAPTER V.

STRATIGRAPHY---THE KANAWHA GROUP.

GENERAL ACCOUNT.

The Kanawha Group or Upper Pottsville Measures, beginning at top with the Homewood or Roaring Creek Sandstone and extending down to the top of the great Nuttall Sandstone of the Kanawha Valley, has a maximum thickness of 1200 feet in the latter region as compared to 1900 feet along the southwestern border of McDowell County. This represents an expansion of 700 feet in an air-line distance of 60 miles. The group was first named by I. C. White¹ from its development along the river of the same designation. In Wyoming and McDowell, the character of its strata varies little from that at its type locality in Kanawha County, generally consisting of massive sandstone, medium grained to coarse and pebbly, micaceous to quartzitic, buff, brown to grayish white in color; coal beds, generally hard and splinty in the upper two-thirds of the group, and soft and columnar in the lower third; impure fire clays; shales, both argillaceous and arenaceous, buff, gray and black in color; and several impure, lenticular and marine fossiliferous limestones. The detailed crop of these measures as outlined on Map II is confined to the western portion of each county. Sandstones predominate, constituting about 60 per cent. of the strata, but the coals have by far the greatest economic value, the formation holding 15 to 20 minable seams, the descriptions of which are given on subsequent pages of this Chapter and Chapter X.

The Kanawha Group affects the topography somewhat different from that in Logan and Mingo Counties, in that long, persistent cliff exposures do not occur so generally around the

¹Vol. II, W. Va. Geol. Survey, pp. 500-502; 1903.

hill slopes, the lack of which renders it much more difficult to trace the members throughout the usually forested region. The thickness and stratigraphic succession of the several strata of this formation are shown in detail in the General Section of the Pottsville Measures, pages 51-60, along with that for the New River and Pocahontas Groups.

LOCAL SECTIONS.

In addition to the many partial sections of the Kanawha Group published on preceding pages in Chapter IV, several will now be given by magisterial districts. Wherever possible, these were determined roughly along the strike in order to get true vertical measurements.

Oceana District (Wyoming).

The following section was measured with aneroid by Gawthrop in the northeastern portion of Oceana District down the north hillside of Crane Fork, $\frac{3}{4}$ mile due north of Crany P. O. The intervals are slightly greater than they should be, owing to the prevailing northwest dip of the rocks:

Section $\frac{3}{4}$ Mile North of Crany, Oceana District.

	Thickness Feet.	Total Feet.	
Concealed from top of knob.....	125	125	
Sandstone and concealed	30	155	
Coal prospect (closed, reported 10' 0"), Campbell Creek (No. 2 Gas), (2330' B.)...	10	165	165'
Shale, concealed and sandstone.....	20	185	
Concealed	210	395	
Shale, gray, silicious.....	14	409	
Coal, slaty.....0' 8 "	} Eagle (6' 3") (2080' B.)	6	415
Coal, soft.....1 0			
Coal, gas.....1 2			
Slate, with coal streaks.0 3			
Coal, gas, columnar.....1 11			
Sulphur band	0 0½		
Coal, gas, soft.....1 2½			
Shale and concealed	180	595	
Shale, gray, silicious	5	600	
Coal, Little Cedar? prospect closed, re- ported 2' 2" of clean coal (1895' B.).....	0	600	185'
Concealed			

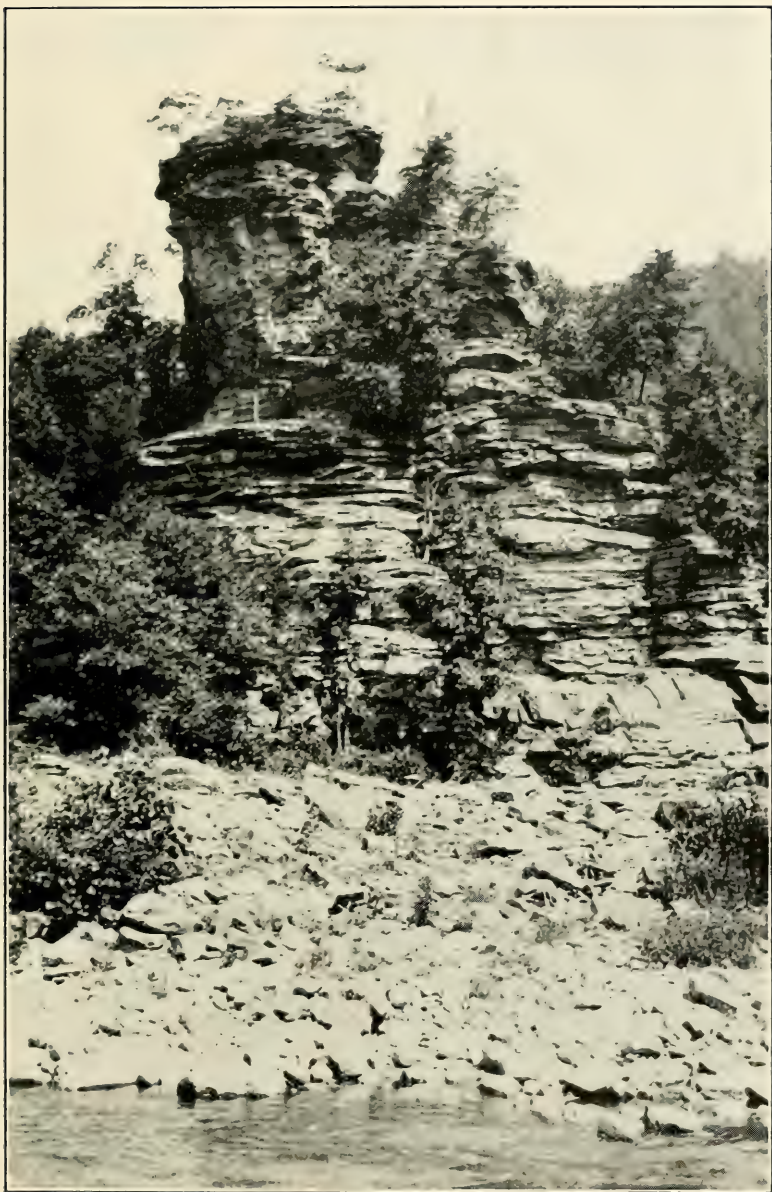


PLATE VIII—Near view of the locally famous “Castle Rock” weathered from Pineville Sandstone, on north bank of Guyandot River at Pineville, just below mouth of Rockcastle Creek, looking north.

In the extreme northern edge of the same district, the following aneroid section was measured by Gawthrop along the bed of Crane Fork, $\frac{3}{4}$ mile southeast of the summit of Pilot Knob, roughly on the strike of the rocks:

Section $\frac{3}{4}$ Mile Southeast of Pilot Knob, Oceana District.

	Thickness Feet.	Total Feet.	
Shale and concealed.....			
Shale, dark gray.....	5	5	
Coal, gas.....2' 6"	} Campbell Creek (No. 2 Gas) Coal (2330' B.)..... (Mine No. 193 on Map II).	11.5	16.5
Shale, gray.....1 4			
Coal, gas.....1 10			
Shale, hard.....0 1½			
Coal, gas.....0 7			
Shale.....0 2½			
Coal, hard.....0 9			
Shale, gray.....0 3			
Coal.....0 1			
Shale, gray.....0 4			
Coal, gas, hard..2 0			
Slate, black.....0 0½			
Coal, gas, hard..1 5			
Fire clay shale and concealed.....	5.5	22	
Sandstone, massive	5	27	
Concealed	10	37	
Sandstone	20	57	
Concealed	5	62	
Sandstone, massive	5	67	
Concealed	18	85	
Sandstone	15	100	
Concealed, with sandstone to mouth of Trace Fork	10	110	
Sandstone, massive	25	135	
Coal, soft.....0' 1½"	} Matewan (2' 1").. (2210' B.)	2	137
Slate, black...0 2½			
Coal, hard.....0 6			
Shale			
Coal, gas, soft..1 2			
Shale, with plant fossils.....	2	139	
Sandstone, shaly.....	6	145	
Concealed	13	158	
Sandstone	7	165	
Concealed, with sandstone	25	190	
Coal (visible, 2' 0"), Eagle (2155' B.).....	2	192	55
Shale, coal, and concealed.....	25	217	
Coal, gas, hard, (visible 0' 6"), Bens Creek (2130' B.).....	0	217	25'
Sandstone, massive, Decota	63	280	
Concealed, with sandstone and shale.....	30	310	

The following section, reaching up to near the top of the Kanawha Group, was measured with aneroid by Gawthrop mostly along the bed of Toney Fork in the northern edge of the same district, its base ending $\frac{3}{4}$ mile S. 10° E. of Walnut Gap. The total dip in the measures from where the Campbell Creek (No. 2 Gas) Coal was encountered along this stream to the Eagle bed is slightly over 100 feet. This accounts for the greatly increased interval between these two seams:

Toney Fork Section, Oceana District.

	Thickness Feet.	Total Feet.	
Unrecorded from top of knob, estimated from topographic contours	800	800	
Sandstone	20	820	
Concealed	20	840	
Sandstone, flaggy	20	860	
Concealed	80	940	
Sandstone	10	950	
Concealed	100	1050	
Shale, gray, silicious	10	1060	
Concealed	15	1075	
Shale	5	1080	
Coal, gas, hard. 1' 7½" } Campbell Creek			
Slate, black ... 0 3½ } (No. 2 Gas)....	9 2"	1089	1089'
Coal, gas, hard. 1 3 } ((2160' B.)			
Shale, reported 2 0 } (Mine No. 194 on			
Coal, reported.. 4 0 } Map II).			
Concealed, with shale	4	1093	
Concealed	7	1100	
Sandstone, massive	30	1130	
Concealed, mostly sandstone.....	20	1150	
Sandstone, massive	35	1185	
Concealed	10	1195	
Sandstone, massive	20	1215	
Concealed	15	1230	
Sandstone, flaggy.....	15	1245	
Shale, gray	14	1259	
Coal, slaty.... 0' 8 " }			
Coal, gas, co-			
lumnar ... 2 6 } Powellton			
Shale, gray ... 0 3½ } (1985' B.)	5 3"	1264	175'
Coal, gas, hard. 1 9½ }			
Shale and concealed	16	1280	
Sandstone, massive	20	1300	
Concealed, with shale.....	25	1325	
Shale	20	1345	
Concealed	20	1365	
Sandstone, massive	40	1405	

	Thickness Feet.	Total Feet.	
Sandstone, flaggy.....	5	1410	
Concealed	39	1449	
Coal, closed (reported 3' 10"), with slate parting near middle, Eagle , (1800' B.)	0	1449	185'

A short distance westward in the same district, the following aneroid section was measured mostly along the hill road leading southward from Walnut Gap to Toney Fork, roughly on the strike of the rocks. With the exception of the Eagle Coal at the base, the correlations are uncertain, the names being based solely on intervals:

Walnut Gap Section, Oceana District.

	Thickness Feet.	Total Feet.	
Unrecorded from top of mountain.....	300	300	
Concealed, with sandstone.....	30	330	
Concealed on bench.....	10	340	
Sandstone, gray, flaggy.....	10	350	
Concealed to road at Walnut Gap.....	35	385	385'
Concealed	15	400	
Sandstone, flaggy and shaly.....	10	410	
Concealed	5	415	
Sandstone, massive, gray, micaceous.....	35	450	
Concealed	43	493	
Coal blossom, (visible, 1' 10"), Hernshaw? (2450' B.).....	2	495	110'
Shale and concealed.....	10	505	
Concealed	15	520	
Concealed, with flaggy sandstone.....	20	540	
Concealed	60	600	
Sandstone	10	610	
Concealed	25	635	
Shale, gray, silicious.....	10	645	
Sandstone, shaly.....	5	650	
Concealed	30	680	
Sandstone	5	685	
Concealed, shale, and concealed.....	70	755	
Coal blossom, (visible, 0' 8"), Lower Cedar Grove? (2190' B.).....	0	755	260
Concealed	5	760	
Sandstone, massive.....	25	785	
Concealed	20	805	
Sandstone, massive, gray, micaceous.....	60	865	
Shale and concealed.....	15	880	
Coal, (visible 1' 2"), Little Alma (2065' B.)	0	880	125
Shale and concealed.....	20	900	
Concealed, with shale.....	30	930	
Coal, Campbell Creek (No. 2 Gas) (2015' B.)	0	930	50

	Thickness Feet.	Total Feet.
Concealed	5	400
Sandstone, flaggy, shaly.....	5	405
Concealed	135	540
Sandstone, flaggy.....	5	545
Concealed, with shale.....	5	550
Shale, gray, silicious.....	4	554
Coal, soft, (1' 3"), <i>laeger</i> , (1455' B.).....	1	555
Shale and concealed.....	35	590
Sandstone, massive, to road.....	15	605

Clear Fork District.

The following section of the Kanawha Group was measured with aneroid by Gawthrop in the northern portion of Clear Fork District, Wyoming County, eastward from the low gap along the hill road on Reedy Branch, 4 miles S. 50° W. of Oceana. The intervals are slightly less than they should be, owing to the rise of the rocks in the direction the measurements were determined:

Reedy Branch Section, 3 Miles Northwest of Ellick, Clear Fork District.

	Thickness Feet.	Total Feet.
Sandstone from low gap.....	20	20
Concealed, mostly sandstone.....	15	35
Sandstone, massive, gray, medium grained..	25	60
Concealed	20	80
Sandstone, flaggy.....	10	90
Concealed, with shale.....	39	129
Coal blossom, (visible, 1' 0"), <i>Hernshaw</i> (2095' B.).....	1	130
Concealed and shale.....	10	140
Sandstone, flaggy.....	10	150
Concealed	25	175
Concealed, with shale and flaggy sandstone.	10	185
Coal, (visible, 0' 9"), (<i>Williamson</i> , (2040' B.)	0	185
Shale	2	187
Sandstone, massive, gray, medium grained, <i>Upper Cedar Grove</i>	8	195
Concealed	30	225
Coal opening, <i>Cedar Grove</i> , thickness con- cealed, (2000' B.).....	0	225
Concealed	27	252
Sandstone, shaly.....	5	257
Shale, gray, silicious.....	3	260

			Thickness Feet.	Total Feet.	
Coal	1' 0"	} Lower Cedar Grove. (1960' B.)			
Coal, hard.....	1 6		5-6"	265	40'
Coal, gas, medium hard.	3 0				
Fire clay and concealed.....			5	270	
Sandstone, massive, gray, hard.....			15	285	
Concealed			5	290	
Sandstone			5	295	
Concealed			93	388	
Coal blossom, visible 1' 8"		} Campbell Creek (1825' B.).....			
Concealed	10 0		12-4"	400	135'
Coal blossom, visible 0 8					
Concealed			2	402	
Sandstone			5	407	
Concealed			3	410	
Coal blossom, (visible, 0' 11"), Powellton "A", (1815' B.).....			0	410	10'
Concealed			20	430	
Coal blossom, Powellton , (1795' B.).....			0	430	20'
Concealed and sandstone, massive.....			5	435	
Concealed			25	460	
Concealed, mostly sandstone.....			50	510	
Concealed			50	560	
Sandstone, massive, gray.....			25	585	
Concealed			70	655	
Shale, gray, silicious.....			5	660	
Concealed			40	700	
Slate, gray, silicious, visible.....			3	703	
Coal, soft....1' 11"		} Little Eagle			
Fire clay.....	0 1		2-2"	705	275'
Coal, soft....	0 2				
Concealed			210	915	
Sandstone, flaggy, to bed of branch of Reedy			5	920	

Huff Creek District.

In the southwestern edge of Huff Creek District, Wyoming County, the following section of the Kanawha Measures was determined with aneroid by the writer roughly on the strike of the rocks northeastward along the hill road on the head of Little Cub Creek, $\frac{1}{2}$ mile southwest of Botsford P. O.:

Botsford Section, Huff Creek District.

	Thickness Feet.	Total Feet.
Sandstone, Eagle	20	20
Concealed	10	30
Sandstone	5	35
Slate, gray, marine fossils , not very distinct, many <i>Calamite</i> stems.....	1	36

	Thickness Feet.	Total Feet.	
Coal .....0' 1"	} Eagle (1600' B.) 4 "Middle War Eagle"	40	40'
Slate, gray.....0 6			
Coal, gas.....1 8			
Slate, gray, 0' 1" to..0 2			
Coal, gas.....1 4			
Concealed by water.0 3			
Concealed	35	75	
Coal, prospect, closed, Bens Creek.....	0	75	35'
Concealed	35	110	
Shale, buff.....	5	115	
Concealed	25	140	
Sandstone	5	145	
Concealed	50	195	
Slate, black, marine fossils numerous, Brachiopods and Pelecypods abundant, Eagle (1435' B.).....	10	205	130'
Sandstone and concealed.....	20	225	
Shale, dark, sandy.....	30	255	
Concealed	25	280	
Coal blossom, Lower War Eagle (1360' B.)..	0	280	75'
Sandstone, massive, Upper Gilbert.....	35	315	
Concealed	125	440	

Sandy River District.

The three following spirit-level sections on the waters of Longpole Creek in the northern point of Sandy River District, McDowell County, with the exception of the addition of 140 feet of measures to the basal portion of the first by the writer, were kindly furnished the Survey by Mr. G. J. Cooper, of Welch, W. Va., the former being responsible for the correlations designated:

Head of Longpole Section, Sandy River District.

Spirit-level measurement by G. J. Cooper down west hillside of Longpole Creek, 1.2 miles southwest of Botsford:				
	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone from top of mountain.....	81	9	81	9
Coal ....0' 6"	} Powellton (1715' L.).	3 3	85 0	85' 0"
Slate ....0 2				
Coal ....0 3				
Mud ....0 1				
Coal ....2 3				
Sandstone and black slate.....	56	4	141	4
Shale, gray.....	3	0	144	4

			Thickness Ft. In.	Total Ft. In.	
Coal ....2' 0"	}	Matewan (1650' L.)..	5 8	150 0	65' 0"
Slate ...2 4					
Coal ....1 4					
Sandstone and slate.....			44 6	194 6	
Coal ....2' 3"	}	Eagle or "Mo- hawk" (1600' L.)..	5 6	200 0	50' 0"
Slate ....2 7					
Coal ....0 8					
Slate and sandstone.....			72 11	272 11	
Coal, Bens Creek (1525' L.).....			2 1	275 0	75' 0"
Sandstone and slate to bed of branch of Longpole Creek.....			50 0	325 0	
Unrecorded and concealed.....			124 3	449 3	
Shale, sandy.....			4 0	453 3	
Slate, black, with plant fossil stems abundant.....			8 0	461 3	
Coal .....0' 7 "	}	Lower War Eagle (1335' B.)	3 9	465 0	190' 0"
Shale, gray..0 5					
Coal .....0 1					
Shale, gray..0 5					
Coal .....0 3					
Slate, gray..0 0¼					
Coal .....2 0					
Concealed by water.....					

Section 1¼ Miles Due North of Longpole P. O., Sandy River District.

Spirit-level measurement by G. J. Cooper, down south hillside of Riffe Branch, 0.1 mile east of mouth, north of Longpole P. O:

			Thickness Ft. In.	Total Ft. In.	
Slate					
Coal .....2' 1"	}	Matewan (1710' L.)....	4 5	4 5	4' 5"
Coal and slate..0 8					
Coal .....1 8					
Sandstone, unrecorded, and sandstone			21 10	26 3	
Shale, gray.....			2 0	28 3	
Coal, Eagle, "Mahawk", "Middle War Eagle", (1680' L.).....			6 2	34 5	30' 0"
Slate, unrecorded, and slate.....			56 10	91 3	
Coal .....2' 3½"	}	Bens Creek (1620' L.)	3 2	94 5	60' 0"
Slate and coal..0 3					
Coal .....0 7½					
Slate, unrecorded, and slate.....			217 8	312 1	
Coal, Lower War Eagle, (1400' L.)....			2 4	314 5	220' 0"
Slate					

Section 1.3 Miles Northeast of Longpole P. O., Sandy River District.

Spirit-level measurement by G. J. Cooper, down south hillside of Riffe Branch 1 mile above mouth, and 1.3 miles northeast of Longpole P. O.:

	Thickness	Total		
	Ft. In.	Ft. In.		
Slate	8 0	8 0		
Coal .....0' 6"	} Matewan (1710' L.)	11 1	11' 1"	
Shale, gray.0 1				
Coal .....0 5				
Slate .....0 2				
Coal .....1 11				
Sandstone, unrecorded, and sandstone	13 6	24 7		
Coal, (Eagle), "Mohawk", (1690' L.)..	6 6	31 1	20' 0"	
Slate, unrecorded, and slate.....	36 9	67 10		
Coal .....2' 2½"	} Bens Creek....	71 1	40' 0"	
Slate, black.0 2				
Coal .....0 10½				
Slate, gray.....	(1650' L.)			

DESCRIPTION OF FORMATIONS.

The reader is referred to the General Section of the Pottsville Measures, given at the beginning of this Chapter, for the relative position of the formations of the Kanawha Group in descending order below:

THE HOMEWOOD (ROARING CREEK) SANDSTONE.

The Homewood Sandstone of the Pennsylvania Survey, or the "Roaring Creek" of I. C. White¹, is the highest formation of the Kanawha Group. In the territory of this Report, it is a great, massive, grayish white rock, often pebbly and current-bedded, ranging in thickness from 75 to 100 feet. Since this member closely underlies the No. 5 Block Coal, its crop follows near the same locality, on the summits of the high ridges and knobs along the northern boundary line of Oceana District, Wyoming County, as outlined on Map II for the latter bed. As its base belongs about 2400 feet above the horizon of the Sewell Coal in the northern portion of the latter area, it should crop near the summit of Burning Rock

¹Vol. II(A), W. Va. Geol. Survey, pp. 488-489; 1908.

Knob on Huff Mountain, and probably caps Panther Knob of the same range. No quarries occur on it, owing to its inaccessibility.

THE KANAWHA BLACK FLINT.

The Kanawha Black Flint, belonging immediately at the base of the last member described in the Kanawha Valley region, loses its characteristic features southwestward from the latter locality, and in Wyoming, its horizon is represented by shale, its crop being confined to the same areas as outlined above for the Homewood Sandstone. No marine fossils were observed at the single exposure noted; viz, at an opening in the Stockton Coal described next below.

THE STOCKTON COAL.

The Stockton Coal, belonging in Kanawha County immediately at the base of the last formation described, is the highest bituminous member of the Kanawha Group. It is generally multiple-bedded, holding both soft and splinty layers. In the territory of this Report, it was observed at only one point; viz, in the northeastern edge of Oceana District (Wyoming), on the head of Spring Fork of Huff Creek, where the following data were obtained by the writer:

Oliver Lusk Farm Mine—No. 171 on Map II.

Wyoming County, 0.2 mile southeast of the common corner of Boone, Logan and Wyoming Counties; **Stockton Coal**; elevation, 2660' B.

	Ft.	In
Shale, horizon of Kanawha Black Flint.....		
Coal	0' 9"	
Slate, black, 1" to.....	0 2	
Coal, gas.....	2 0	
Coal, interlaminated with black slate....	1 6	
Coal, gas.....	2 0	6 5
Slate		

The crop of this coal is confined to practically the same region as outlined above for the Homewood Sandstone. Its character and approximate minable area as exhibited in Figure 6, along with that for the No. 9 Pocahontas Coal, are given on subsequent pages in Chapter X. Owing to its occurrence near the summits of the high mountains, as mentioned for the crop of the latter sandstone, it has not been feasible, except in the above instance, to open this bed even for domestic purposes.

THE UPPER COALBURG SANDSTONE.

The next 25 to 50 feet of measures immediately below the coal last described is generally occupied by impure fire clay and sandy shale; then comes the Upper Coalburg Sandstone of White², which is generally coarse, massive and gray in color, forming steep slopes around the hillsides of northern Wyoming County near the summits of the high ridges and knobs. Its crop is confined to the northwestern portions of Oceana and Clear Fork Districts. No quarries were observed on this ledge.

THE COALBURG COAL.

The Coalburg Coal of White³, belonging 5 to 10 feet below the formation last described and 100 to 150 feet below the Stockton bed, is probably present in minable dimensions near the summit of Buffalo and Huff Mountains in the northwestern portions of Oceana and Clear Fork Districts, Wyoming County, although no exposures either in prospects or at crop were observed. This may be attributed to the fact that its crop occurs not only at a high elevation, but also in a forested region. Its character and approximate minable area as outlined on Figure 7, along with that for the No. 7 Pocahontas Coal, are discussed on subsequent pages in Chapter X.

The Little Coalburg Coal, Lower Coalburg Sandstone, Buffalo Creek Coal and Buffalo Creek Limestone, of Hennen

²I. C. White, Vol. II(A), W. Va. Geol. Survey, p. 468; 1908.

³I. C. White, Vol. II, W. Va. Geol. Survey, pp. 548-566; 1903.

and Reger⁴, were not observed in the Wyoming-McDowell Area. Their horizons crop, however, high up on the slopes of Buffalo and Huff Mountains in the northwestern portions of Oceana and Clear Fork Districts, the same conditions operating against the prospecting of the two coals by natives as mentioned above for the Coalburg seam. It is not probable that either attains minable dimensions in the territory of this Report, although the Buffalo Creek is a very important bed commercially in the adjoining County of Mingo, northward from Matewan and Williamson.

THE UPPER WINIFREDE SANDSTONE.

The Upper Winifrede Sandstone of White⁵, belonging immediately above the Winifrede Coal and 50 to 150 feet below the Coalburg bed, has practically the same character as in Kanawha County—its type locality—being coarse, massive, gray to brown, and forming steep slopes around the mountain sides in the region of its crop high up on the slopes of Buffalo and Huff Mountains. No quarries were observed on it.

THE WINIFREDE COAL.

The Winifrede Coal of White⁵, belonging at its type locality in Kanawha County, 175 to 200 feet below the Kanawha Black Flint, 75 to 100 feet below the Coalburg Coal, and 75 to 90 feet above the Chilton bed, has been correlated with a seam coming 140 to 150 feet above the Chilton in the territory of this Report, as placed by Hennen and Reger⁶ in the adjoining area of Logan County. The crop of its horizon is confined to the high ridges and spurs of Buffalo and Huff Mountains in the northwest portions of Oceana and Clear Fork Districts (Wyoming). It no doubt occurs in minable thickness in this region, since it is in fair development on the Logan side of the County Line, although no prospects or crop exposures were observed in Wyoming, due to the fact that this locality is heavily wooded. Its probable character

⁴Logan-Mingo Report, W. Va. Geol. Survey, pp. 140-143; 1914.

⁵T. C. White, Vol. II(A), W. Va. Geol. Survey, p. 271; 1908.

⁶Logan-Mingo Report; W. Va. Geol. Survey, pp. 144-5; 1914.

and approximate minable area as exhibited on Figure 8, along with that for the No. 6 Pocahontas Coal, are given on subsequent pages in Chapter X.

The **Lower Winifrede Sandstone** of White⁷, and the **Chilton "A" Coal**, **Upper Chilton Sandstone**, and **Chilton "Rider" Coal** of Hennen and Reger⁸ were not observed in the territory of this Report, since the same conditions operate against their exposure at crop as mentioned for the Coalburg Coal. Their horizons come to the surface, however, and are confined to the regions high up on the ridges and spurs of Buffalo and Huff Mountains in the northwest portions of Oceana and Clear Fork Districts (Wyoming). It is doubtful if either of the two coals attains minable dimensions in the area under discussion.

THE WINIFREDE LIMESTONE.

The marine fossiliferous Winifrede Limestone of White⁹, belonging at its type locality—Winifrede, Kanawha County—65 to 70 feet below the Winifrede Coal and 20 to 30 feet above the Chilton bed, was not observed. However, it is undoubtedly present in characteristic form in the northeastern portion of Oceana District on the head of Toney and Crane Forks, 450 to 500 feet above the Campbell Creek (No. 2 Gas) Coal—the detailed crop of the latter being shown on Map II—since it is exposed at an elevation of 2655' B. as determined with aneroid by the writer, on the south edge of Indian Gap, 0.6 mile northwest from the summit of Pilot Knob, or the common corner of Wyoming, Boone and Raleigh Counties. Here it is 27 feet by hand-level above the heavy blossom of the Chilton Coal, cropping immediately in the Gap, and 500 feet by aneroid above an opening in the Campbell Creek (No. 2 Gas) Coal. Fossils of the genus **Productus** abound. It is barely possible that the **Buffalo Creek Limestone**, described on a preceding page of this Chapter, may correlate with the

⁷I. C. White, Vol. II(A), W. Va. Geol. Survey, p. 271; 1908.

⁸Logan-Mingo Report, W. Va. Geol. Survey, pp. 146-8; 1914.

⁹I. C. White, Vol. II(A), W. Va. Geol. Survey, p. 431; 1908.

Winifrede, but its interval—175 to 200 feet above the definitely correlated Chilton Coal in the Rawl region of Mingo County—appears too great when compared to its position in the Kanawha Valley.

THE CHILTON COAL.

The Chilton Coal of White¹⁰, belonging at its type locality—Chilton, Kanawha County—70 feet below the Winifrede Coal, is confined to practically the same region as outlined above for the latter bed. In the area immediately adjoining the territory of this Report, on the west, the coal has been very fully described by Hennen and Reger¹¹. No prospects on it were seen, but its blossom was noted by the writer along the hill road on the head of Lower Road Branch, 2½ miles northwest of Oceana, Wyoming County, at an elevation of 2055' B. That it must occur in good minable thickness and purity in the latter county is evidenced by its sections at Openings Nos. 274 and 275 of the Logan-Mingo Report, where it totals 5 feet 2 inches and 9 feet 2 inches, respectively, each being in Logan County, about a mile from the Wyoming Line—the former, on the north side of Buffalo Mountain, 0.9 mile northwest of the common corner of Wyoming, Logan and Boone Counties; the latter, on the north side of Huff Mountain, 2½ miles due west of Campus and 1¼ miles west of the Wyoming-Logan Line. It is generally multiple-bedded and splinty. Its character and approximate minable area as outlined on Figure 9, along with that for the No. 5 Pocahontas bed, are given on subsequent pages in Chapter X.

The **Lower Chilton Sandstone**, **Little Chilton Coal**, and **Hernshaw Sandstone** of Hennen and Reger¹¹, belonging in the interval between the Chilton and Hernshaw Coals, are confined to near the summits of the high ridges and spurs of Huff and Buffalo Mountains in the northwest portions of Oceana and Clear Fork Districts (Wyoming). The thickness and

¹⁰I. C. White, Vol. II(A), W. Va. Geol. Survey, p. 430; 1908.

¹¹Ray V. Hennen and D. E. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 150-6; 1914.

stratigraphic position of the first is exhibited in the section for Cedar Creek, page 65. It is very doubtful if the Little Chilton Coal attains minable dimensions in the territory of this Report, since it is of no commercial importance in the adjoining area of Logan and Mingo, as shown in the Report for the latter counties. It was not observed either at prospect openings or crop exposures.

THE HERNSHAW COAL.

The Hernshaw Coal of Hennen and Reger¹², belonging at its type locality—Hernshaw, Kanawha County—175 feet below the Winifrede Coal and 120 feet above the Cedar Grove bed, is confined to the same general region of Wyoming County as that for the formation last described. It is multiple-bedded, containing both soft and splint types of coal, and there is considerable doubt whether it attains minable dimensions. Its thickness and relative position in the rock column are exhibited in the sections given on preceding pages for Cedar Creek, Walnut Gap and Reedy Branch. It appears to be this bed that crops along the hill road on the head of Lower Road Branch, 2½ miles northwest of Oceana, Wyoming County, where the following section was measured by the writer:

	Feet.	Inches.
Shale, sandy, buff		
Sandstone, Hernshaw	10	0
Shale	3	0
Coal, Hernshaw (2010' B.).....	2	2
Shale and concealed	4	

Its crop high up on the wooded slopes of Buffalo and Huff Mountains has retarded its prospecting by the natives, and, since all the Coal Test Borings within the two counties begin below the base of the Kanawha Group, the data concerning the character of this coal as also the higher veins of the latter group are very meager. As in Logan and Mingo Counties, it is too thin, irregular and impure to be classed as a minable

¹²Ray V. Hennen & D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 156-163; 1914.

bed, although some localities may furnish a fair grade of fuel, especially along the south slope of Buffalo Mountain.

The **Naugatuck Sandstone**, **Dingess Coal**, **Williamson Sandstone**, and **Dingess Limestone and Shale** of Hennen and Reger¹³, belonging in the interval between the Hernshaw and Williamson Coals, were not observed, although their horizons crop in practically the same region of Oceana and Clear Fork Districts as outlined for the coal last described. The lack of test borings and well defined sections due to the forest conditions prevailing high on the slopes of Buffalo and Huff Mountains both tended to increase the difficulty in finding exposures at these particular horizons. It is very doubtful whether the **Dingess Coal** attains minable dimensions and purity in the area under discussion.

THE WILLIAMSON COAL.

The Williamson Coal of Hennen and Reger¹⁴, belonging at its type locality—Williamson, Mingo County—immediately below the marine fossiliferous Dingess Limestone and Shale and 60 to 75 feet above the Cedar Grove ("Upper Thacker") Coal, was observed at crop exposures, its area being confined to practically the same portions of Oceana and Clear Fork Districts, as outlined above for the Hernshaw bed. Its stratigraphic position is exhibited in the Reedy Branch Section, page 133. It is generally multiple-bedded and irregular, containing both splint and soft types, with many slate partings which tend to lower its commercial importance. As it belongs about 300 feet above the Campbell Creek (No. 2 Gas) Coal, the crop of the latter being shown in detail on Map II, its position may be readily approximated in the region of its occurrence. Its thickness, character and minable area are given on subsequent pages in Chapter X.

¹³Ray V. Hennen & D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 163-6; 1914.

¹⁴Ray V. Hennen and D. B. Reger, W. Va. Geol. Survey, Logan-Mingo Report, pp. 166-8; 1914.

THE UPPER CEDAR GROVE SANDSTONE.

The Upper Cedar Grove Sandstone of Hennen and Reger¹⁵, belonging 5 to 20 feet below the last coal described and 15 to 30 feet above the Cedar Grove Coal and ranging in thickness from 10 to 40 feet, forms steep bluffs in the topography in the same general region as outlined for the Williamson Coal. Its stratigraphic position is given in the Reedy Branch Section at the beginning of this Chapter. No quarries were observed on it, but it has given excellent results in the adjoining County of Logan, where it has been quarried quite extensively in the Holden region for building purposes.

The marine fossiliferous **Seth Limestone** of Krebs¹⁶, belonging in the shale interval separating the last sandstone described and the Cedar Grove Coal, was not observed, but its horizon crops in practically the same regions as outlined on a preceding page for the Williamson Coal, and near the summits of the highest hills along the northwest margins of Huff Creek District (Wyoming) and Sandy River District (McDowell).

THE CEDAR GROVE ("THACKER", ISLAND CREEK") COAL.

The Cedar Grove Coal of White¹⁷, belonging at its type locality—Cedar Grove, Kanawha County—about 300 feet below the Winifrede Coal and 100 to 120 feet above the Campbell Creek ("No. 2 Gas") bed, attains a fine development. Here it is multiple-bedded, with both splint and soft coal, the former type predominating, and it ranges in thickness from 4 to 10 feet. Its development in the immediately adjoining area on the west is fully described on pages 170-2 and 512-71 of the Logan-Mingo Report of the State Survey, in which it is shown to correlate with the "Island Creek" bed of Logan and the "Thacker" or "Red Jacket" seam of Mingo County. Its

¹⁵Ray V. Hennen and D. B. Reger, W. Va. Geol. Survey, Logan-Mingo Report, pp. 169-170; 1914.

¹⁶C. E. Krebs, Boone County Report, W. Va. Geol. Survey, p. 155; 1915.

¹⁷I. C. White, Bull. 65, U. S. G. Survey, pp. 138-140; 1891; and Vol. II, W. Va. Geol. Survey, p. 562; 1903.

area and crop are confined to the same regions as given above for the **Seth Limestone**, and it attains its best development along the northwest margin of Sandy River District (McDowell), where a total section of the bed, including parting slates, measures 17 feet 11 inches. Its relative position in the rock column is exhibited in the Cedar Creek and Reedy Branch Sections, published on preceding pages. Its thickness and character, as shown at country banks and prospect openings, and approximate minable area as outlined on Figure 10 are given on subsequent pages of Chapter X, along with an estimate of its available tonnage by magisterial districts.

The **Middle Cedar Grove Sandstone** of Hennen and Reger¹⁸, belonging in the interval separating the coal last described and the Lower Cedar Grove ("Lower Thacker") bed and ranging in thickness from 40 to 60 feet, forms steep slopes in the topography wherever it crops, the latter feature being confined to the same areas as outlined for the coal last described. No quarries were observed on it, due largely to its high elevation above drainage.

THE LOWER CEDAR GROVE ("LOWER THACKER") COAL.

The Lower Cedar Grove Coal of Hennen and Reger¹⁹, belonging immediately at the base of the last formation described and ranging in thickness from 3 to 5 feet, attains a fair development in the area under discussion. Its description in the immediately adjoining area of Logan and Mingo Counties, on pages 174-5 and 571-89 of the Report for the latter area, has an important bearing on its condition in the territory of this Report, where it is shown to correlate with a split off the Cedar Grove proper of the Kanawha Valley, and to be the same as the "Lower Thacker" bed of Mingo County. Its area and crop are confined to practically the same region as that outlined above for the Cedar Grove Coal. Its thickness and stratigraphic position are exhibited in the sections

¹⁸Ray V. Hennen and D. B. Reger, W. Va. Geol. Survey, Logan-Mingo Report, pp. 172-3; 1914.

¹⁹Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 173-4; 1914.

given on preceding pages for Cedar Creek, Walnut Gap and Reedy Branch—all in the northwest portion of Wyoming County. Its thickness, composition and fuel value at country banks and prospect openings and approximate minable area as outlined on Figure 11, are described on subsequent pages of Chapter X, along with an estimate of its available tonnage by magisterial districts.

The **Lower Cedar Grove Sandstone and Alma "A" Coal** of Hennen and Reger²⁰, belonging immediately below the coal last described, were not observed, although their horizons should crop in the same regions as outlined for the Lower Cedar Grove Coal.

THE ALMA COAL.

The Alma Coal of White²¹, belonging at its type locality—near Sprigg, Mingo County—120 to 140 feet below the Cedar Grove ("Thacker") seam and 100 to 120 feet above the Campbell Creek (No. 2 Gas) bed, has a fine development, ranging in thickness from 3 to 5 feet. It is generally multiple-bedded, containing both soft and splint types of coal, the latter predominating in the lower portion of the seam. Its area and crop are confined to practically the same regions as outlined on a preceding page for the Cedar Grove Coal. Its description in the immediately adjoining Counties of Logan and Mingo on pages 177-8 and 589-628 of the Report for the latter areas has a direct bearing on its condition in the area under discussion, to which the reader is referred for a type section of the bed. As the detailed crop of the Campbell Creek Coal is shown on Map II, the position of the Alma may be readily determined, since the latter belongs slightly over 100 feet higher in the measures. In Wyoming its thickness and stratigraphic position are exhibited in the section for Cedar Creek, page 65. Its character and approximate minable area as outlined on Figure 12 are discussed on subsequent pages in Chapter X, along with an estimate of its tonnage by magisterial districts.

²⁰Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 175-6; 1914.

²¹I. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 404-7; 1908.

THE MONITOR ("LOGAN") SANDSTONE

The Logan Sandstone of Hennen and Reger²², belonging at its type locality—Logan, Logan County—1 to 5 feet below the coal last described, is very persistent in Wyoming and McDowell, and forms steep slopes and prominent escarpments around the hillsides wherever it outcrops, the latter feature following closely the same region as outlined for the crop of the Alma Coal. Since the publication of the Report last cited, it has been learned that Orton of the Ohio Geological Survey had previously named a stratum belonging in the Mississippian Rocks the "Logan Sandstone"; hence, in order to conform to the rules of geologic nomenclature to avoid duplication of names, the quarry ledge at Logan is herein redesignated the **Monitor Sandstone** from the town of Monitor, Logan County, its thickness and stratigraphic position at a quarry on it at the latter point being shown on page 179 of the Report last cited. It is generally massive, gray to bluish gray, medium grained and micaceous, ranging in thickness from 30 to 50 feet. In the immediately adjoining counties on the west it has been used successfully for building purposes, but no quarries on it were observed in either Wyoming or McDowell. Its thickness and relative position in the rock column are exhibited in the Oceana Section, page 61. Its comparatively high elevation above drainage, even on Huff Creek, in the western point of Oceana District (Wyoming), will in a measure operate against its being quarried extensively in competition with an inexhaustible supply of building stone close down along the stream beds.

THE LITTLE ALMA COAL.

The Little Alma Coal of Hennen and Reger²³, belonging immediately at the base of the sandstone last described and about midway in the interval separating the Alma and Campbell Creek (No. 2 Gas) beds, is a thin, persistent, double-bedded gas coal that hardly attains minable dimensions and

²²Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 178-180; 1914.

²³Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 180-3; 1914.

purity, its area and crop being confined to the same regions as outlined above for the Alma seam. Its stratigraphic position is exhibited in the Walnut Gap Section, published on a preceding page of this Chapter. In the northeastern edge of Oceana District (Wyoming), the writer measured the following section at its exposure in the bed of Laurel Branch of Huff Creek, at an elevation of 1700' B.:

	Feet.	Inches.
Sandstone, massive, Monitor ("Logan")	50	0
Coal, gas, Little Alma	1	6
Shale, dark	1	0
Sandstone, massive	10	0

Three and a half miles westward in the same district, it has the same thickness, according to Gawthrop, at an old digging on the west bank of Toney Fork of Huff, 3.2 miles above the mouth of the former.

In the northwestern border of Clear Fork District (Wyoming), Gawthrop reports the following at its crop in the bed of Mosby Branch, near the head of the latter, at an elevation of 1660' B.:

	Feet.	Inches.
Coal, Lower Cedar Grove, reported by James Blankenship	3	6
Shale and concealed	78	0
Sandstone, massive, Monitor ("Logan")	20	0
Coal, gas, Little Alma	1	8
Shale and concealed		

Since these are the thickest exposures observed, it is evidently too thin to be classed as minable.

The **Peerless Sandstone** of Krebs²⁴ and the **Campbell Creek Limestone** of White²⁵, belonging in the interval separating the coal last described from the Campbell Creek (No. 2 Gas) bed, 40 to 60 feet lower in the measures, were not specially observed, but they are certainly represented, since their horizons crop closely along the same regions as outlined on Map II for that of the Campbell Creek Coal.

²⁴C. E. Krebs, Kanawha County Report, W. Va. Geol. Survey, p. 281; 1914.

²⁵I. C. White, Bull. 65, U. S. G. Survey, p. 168; 1891; and Vol. II, W. Va. Geol. Survey, p. 566; 1903.

THE CAMPBELL CREEK ("NO. 2 GAS", "WARFIELD") COAL.

The Campbell Creek Coal of White²⁶, belonging 20 to 40 feet below the limestone last mentioned at its type locality—Campbell Creek, Kanawha County—has a fine development in Wyoming and McDowell, ranging in thickness from 3 to 10 feet. It is generally multiple-bedded, containing both gas and splint types of coal, the former predominating. Its area is confined to the western portions of each county and its detailed crop is outlined on Map II. Its description in the immediately adjoining Counties of Logan and Mingo on pages 185-190 and 628-670 of the Report for the latter areas has an important bearing on its condition within the territory of this Report, to which the reader is referred for several type sections at scattered points in the State southwestward from the Kanawha River. Therein it is shown to correlate with the "Warfield", "Freeburn", "Burnwell", and "Upper War Eagle" beds of Mingo County. In the area under discussion, its thickness and stratigraphic position are exhibited in the sections for Cedar Creek, Crany, Pilot Knob, Toney Fork, Walnut Gap and Reedy Branch.

Its thickness and character at country banks, prospect openings and crop exposures, and approximate minable area as outlined on Figure 13 are described on subsequent pages in Chapter X, along with an estimate of its available tonnage by magisterial districts.

THE BROWNSTOWN SANDSTONE.

The Brownstown Sandstone of White²⁷, belonging at its type locality—Brownstown, Kanawha County—immediately at the base of the coal last described, is very persistent, and it is generally massive to heavy-bedded, bluish gray to yellowish gray in color, medium grained and micaceous, ranging in thickness from 25 to 50 feet. Its outcrop follows closely the same region as outlined on Map II for the Campbell Creek (No. 2 Gas) Coal. Its thickness, character and relative posi-

²⁶L. C. White, Bull. 65, U. S. G. Survey, p. 170; 1891; and Vol. II, W. Va. Geol. Survey, pp. 567-84; 1903.

²⁷L. C. White, Vol. II, W. Va. Geol. Survey, p. 586; 1903.

tion in the rock column are exhibited in the General Sections in Chapter IV for Oceana, in Wyoming; and, Mouth of Longpole, in McDowell County.

The **Powellton "A" Coal** of Hennen and Reger²⁸, belonging at the base of the stratum last described and 15 to 20 feet above the Powellton bed, was not observed.

THE POWELLTON (BROWNSTOWN) COAL.

The Powellton (Brownstown) Coal of White²⁹, belonging at its type locality—Brownstown, Kanawha County—70 feet below the Campbell Creek Coal and 20 to 40 feet below the Brownstown Sandstone, attains minable dimensions and purity in the Wyoming-McDowell Area. It is generally multiple-bedded and ranges in thickness from 3 to 5 feet. As mentioned on pages 192-5 of the Report for Logan and Mingo Counties, it correlates with the "**Hatfield Tunnel**" seam. Its area and crop are confined to practically the same regions as outlined above for the Campbell Creek Coal, and its best development occurs in the northeast portion of Oceana District (Wyoming). Its thickness and relative position in the rock column are exhibited in the General Section in Chapter IV for the Mouth of Longpole, and in the special sections of the Kanawha Group on preceding pages of this Chapter for Toney Fork, Reedy Branch and Head of Longpole. It has not been mined on a commercial scale in either county, but its thickness and character at country banks and prospect openings, and its approximate minable area as given in Figure 14 are described on subsequent pages in Chapter X, along with an estimate of its available tonnage by magisterial districts.

THE CANNELTON (STOCKTON) LIMESTONE AND SHALE.

The Cannelton (Stockton) Limestone of White³⁰, belonging at its type locality—Cannelton, Kanawha County—75 to 100 feet below the Campbell Creek Coal and 45 to 50 feet above

²⁸Ray V. Hennen and D. B. Reger, Logan-Mingo Report, p. 192; 1914.

²⁹I. C. White, W. Va. Geol. Survey, Vol. II, pp. 511 and 585; 1903; and Vol. II(A), pp. 272 and 349; 1908.

³⁰I. C. White, Vol. II, W. Va. Geol. Survey, p. 586; 1903.

the Eagle bed, is fairly persistent, and it overlies the Matewan Coal a distance of 20 to 35 feet, which interval is usually occupied by **dark shales with marine fossils** in southeastern Boone and northern Wyoming Counties. These shales probably belong in the same horizon as the limestone at Cannelton, although no marine fossils have yet been reported from the ledge itself; hence, their inclusion with this stratum in the above heading.

In the northern edge of Oceana District, the following section, typical of its development in Wyoming County, was measured by the writer at the north edge of the road on Huff Creek, less than 200 yards above the mouth of Laurel Branch:

	Feet.	Inches
Sandstone, Brownstown	30	0
Shale, dark, sandy	6	0
Limestone, dark gray, lenticular, cone-in-cone structure on outer shell, Cannelton (Stockton)	1	3
Shale, black, sandy, with marine fossils, Cannelton (Stockton)	15	0
Slate, black, fossil plants abundant, Calamites predominating	2	0
Coal, with partings, Matewan (1580' B.)	9	6
Slate		

Northward just across the mountain on Pond Fork near Echart in Boone County, these same fossiliferous shales occur just above the Matewan Coal, 60 to 75 feet above an opening in the undoubted Eagle bed, and 110 to 125 feet below the Campbell Creek (No. 2 Gas) seam. Their occurrence at other points will be given on subsequent pages of Chapter X under the description of the Matewan Coal.

THE MATEWAN COAL.

The Matewan Coal of Hennen and Reger³¹, belonging at its type locality—Matewan, Mingo County—150 feet below the Campbell Creek (No. 2 Gas) bed and 70 feet below the Powellton ("Hatfield Tunnel") seam, attains minable dimensions, apparently having its best development in the northern

³¹Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 197; 1914.

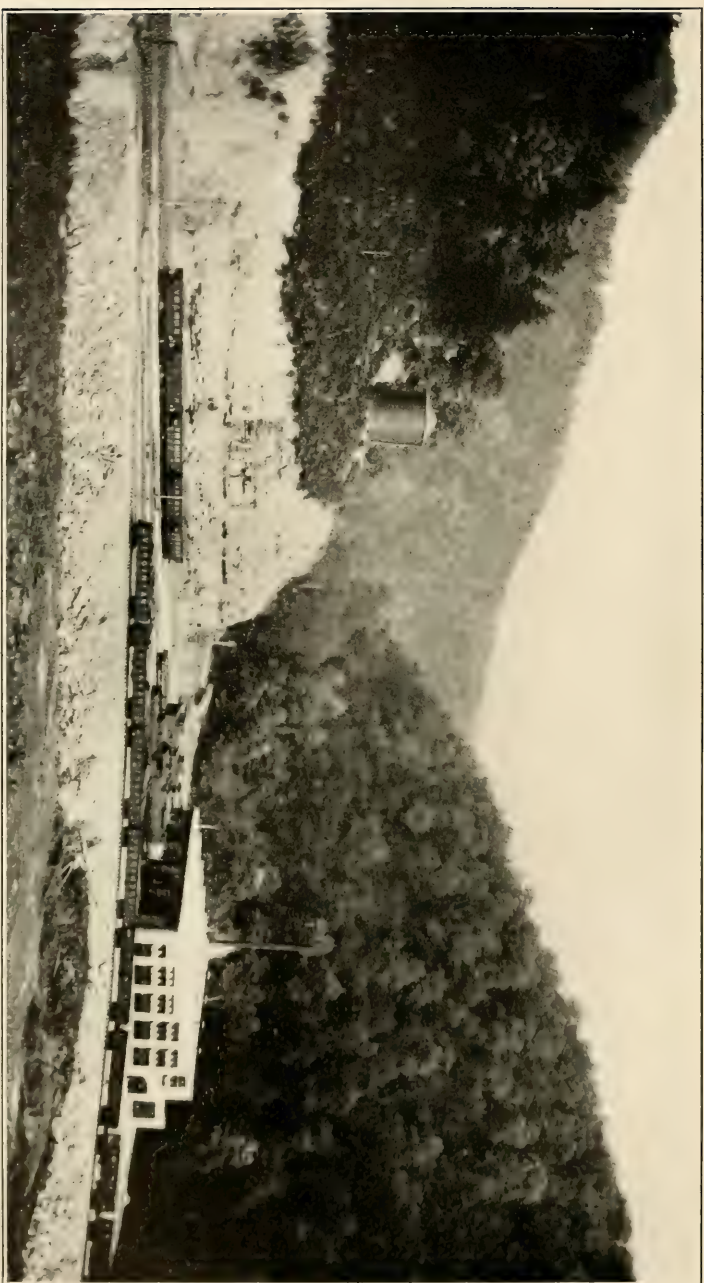


PLATE IX.—Showing round-house of Virginian R. R. and topography of Pocahontas Group at mouth of Barkers Creek, Wyoming County, looking southeast up Barkers Creek, No. 3 Pocahontas Coal at base of tank.

portion of Oceana District, Wyoming County. In the latter region, it is a medium hard gas coal, generally multiple-bedded, ranging in thickness from 3 to 9 feet, including partings, and immediately underlies the marine fossiliferous Cannelton (Stockton) Limestone and Shale, described above. Its thickness and stratigraphic position are exhibited in the general sections in Chapter IV for Clear Fork Gap in Wyoming, and Mouth of Longpole in McDowell County; and in the special sections at the beginning of this Chapter for Pilot Knob, Head of Longpole, North of Longpole P. O., and Northeast of Longpole P. O. Its thickness, composition and fuel value at country banks and prospect openings, and approximate minable area and tonnage are described on subsequent pages in Chapter X.

THE MATEWAN SANDSTONE.

The Matewan Sandstone of Hennen and Reger³², belonging immediately below the coal last described at its type locality—Matewan, Mingo County—has practically coalesced with the underlying Eagle Sandstone in the territory of this Report, apparently cutting out the Eagle "A" Coal of Hennen and Reger³³, since the latter bed was not observed. Its stratigraphic position is exhibited in the sections for Walnut Gap and Douglas Station.

THE EAGLE SANDSTONE.

The Eagle Sandstone of Hennen and Reger*, belonging immediately above the coal of the same name, is very persistent, ranging in thickness from 40 to 60 feet. It is light gray to yellowish gray in color, medium grained to coarse, and forms steep slopes and escarpments around the hillsides of northwestern Wyoming and McDowell Counties, the area of its crop following closely the same region as that outlined on Map II for the Eagle Coal. Its thickness and stratigraphic

³²Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 199; 1914.

³³Ibid, pp. 200-3.

*Ibid, pp. 202-3.

position are exhibited in the general sections in Chapter IV for Wyoming (Dotson), Mohawk, Mouth of Longpole, and Douglas Station.

THE EAGLE COAL.

The Eagle Coal of White³⁴, belonging at its type locality—Eagle, Fayette County—135 to 140 feet below the Campbell Creek bed and 75 to 80 feet above the marine fossiliferous **Eagle Limestone**, attains a fine development, and it is the highest seam, geologically, that has been mined on a commercial scale in either county. Here, it is generally multiple-bedded, containing both semi-splint and soft, columnar gas types of coal, the latter predominating in the northeast portion of Wyoming, the thickness of the vein, including parting slates, ranging from 3 to 6 feet. Its description in the immediately adjoining area—Logan and Mingo—on the west in the Report for the latter Counties, pages 203-4 and 670-84, where it is shown to correlate with the “**Middle War Eagle**” bed of Turkey Creek, Mingo County, has an important bearing on its condition in the territory of this Report. In the locality last mentioned, it belongs 200 to 225 feet below the Campbell Creek (“Upper War Eagle”) Coal and 175 to 200 feet above the marine fossiliferous Eagle Limestone and Shale. Its area and crop as shown on Map II is confined to the western portion of each county, and it is this bed that is being mined commercially at Mohawk, Panther and Douglas Stations, in Sandy River District (McDowell), where it is locally called the “Mohawk” Coal. Its thickness and stratigraphic position are exhibited in the general sections in Chapter IV for Oceana, Clear Fork Gap, Wyoming (Dotson), Mohawk, Mouth of Longpole, and Douglas Station; and in the special sections of the Kanawha Group at the beginning of this Chapter for Crany, Pilot Knob, Toney Fork of Clear Fork, Walnut Gap, Botsford, Head of Longpole, North of Longpole P. O., and Northeast of Longpole P. O.

Its thickness, composition and character at the commercial mines, country banks, prospect openings and crop expos-

³⁴L. C. White, Bull. 65, U. S. G. Survey, p. 140; 1891; and Vol. II, W. Va. Geol. Survey, p. 587; 1903.

ures, and approximate minable area as outlined on Figure 15, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage by magisterial districts.

THE BENS CREEK SANDSTONE.

The Bens Creek Sandstone of Hennen and Reger³⁵, belonging at its type locality—Bens Creek, Mingo County—in the interval separating the “Middle War Eagle” (Eagle) Coal from the Bens Creek bed, is fairly persistent as a separate and distinct stratum in Huff Creek District (Wyoming) and Sandy River District (McDowell County). Northwestward in Clear Fork and Oceana Districts, it apparently thins away and permits the underlying Bens Creek Coal to join with the “Middle War Eagle” seam to form the Eagle Coal proper of the Kanawha Valley. Its thickness and stratigraphic position are exhibited in the Mohawk Section, page 86.

THE BENS CREEK COAL.

The Bens Creek Coal of Hennen and Reger³⁶, belonging immediately at the base of the formation last described at its type locality—Bens Creek, Mingo County—and directly above the Decota Sandstone, attains minable dimensions in Huff Creek District (Wyoming) and Sandy River District (McDowell), where it is generally multiple-bedded, soft, and columnar, much resembling in physical appearance the coals of the New River and Pocahontas Groups. As suggested above under the description of the sandstone of the same name, it seems to be a split off the Eagle Coal proper of the Kanawha Valley. Its area and crop are confined to practically the same regions as outlined above for the Eagle seam. Its description in the immediately adjoining area of Logan and Mingo on pages 205-6 and 684-90 of the Report for the latter Counties has a direct bearing on its condition in the contiguous portions of Wyoming and McDowell. Its thickness and relative posi-

³⁵Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 204-5; 1914.

³⁶Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 205-6; 1914.

tion in the rock column are exhibited in the special sections of the Kanawha Group at the beginning of this Chapter for Pilot Knob and Botsford in Wyoming, and for Head of Longpole, Longpole P. O.—North, and Longpole P. O., in McDowell. It has never been mined commercially in the State, but its thickness and character at country banks, prospect openings and crop exposures, and approximate minable area as outlined on Figure 27 along with that for the No. 4 Pocahontas Coal, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE DECOTA SANDSTONE.

The Decota Sandstone of Krebs³⁷, belonging in the interval separating the Eagle and Little Eagle Coals at its type locality—Decota, Kanawha County—is very persistent, and it is generally massive to heavy-bedded, medium grained to coarse, micaceous, light to yellowish gray in color, ranging in thickness from 40 to 60 feet. Its increased thickness along with the development of the Bens Creek Sandstone in southwestern Wyoming and western McDowell is mainly responsible for the greater intervals from the Eagle Coal in these regions down to the Little Eagle bed, and to the marine fossiliferous Eagle Limestone and Shale, over that found in the Kanawha Valley and in Oceana District of the former county. It forms steep slopes and escarpments around the hillsides wherever it crops, the latter following closely the same region as that outlined for the crop of the Eagle Coal on Map II. Its thickness and relative position in the rock column are exhibited in the general sections in Chapter IV for Oceana and Clear Fork Gap; and in the special sections of the Kanawha Group for Pilot Knob and Walnut Gap on preceding pages of this Chapter. No quarries were observed on it in either County.

³⁷C. E. Krebs, Kanawha County Report, W. Va. Geol. Survey, p. 292; 1914.

THE LITTLE EAGLE COAL.

The Little Eagle Coal of White³⁸, belonging at its type locality—Eagle, Kanawha County—immediately at the base of the sandstone last described and 20 to 30 feet below the Eagle bed, is very persistent, and it attains minable dimensions and purity, having its best development in Oceana and Clear Fork Districts (Wyoming). It is generally multiple-bedded, soft and columnar, ranging in thickness from 2 to 4 feet.

The roof shales carry a marine fossil fauna in Wyoming County, at Oceana and on the head of Cedar Creek, $2\frac{1}{4}$ miles northwest of Ellick, three different species of *Pelecypoda* were observed by the writer and Dr. Price, but the specimens are comparatively rare.

Its relative position in the rock column is exhibited in the general sections in Chapter IV for Oceana, One Mile Southeast of Oceana, and Paynesville; and in the special section of the Kanawha Group on a preceding page of this Chapter for Reedy Branch. It has not been mined as yet on a commercial scale, but along Clear Fork in Wyoming County, it has been opened at several points both above and below Oceana for local domestic fuel. Its area and crop are confined to practically the same region as outlined on Map II for the Eagle seam. In the area under discussion, it belongs 70 to 110 feet below the latter coal and 40 to 60 feet above the marine fossiliferous Eagle Limestone and Shale.

Its thickness, composition and fuel value at country banks and prospect openings, and its minable area as outlined on Figure 16, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE CEDAR COAL.

The Cedar Coal of Hennen and Reger³⁹, belonging at its type locality—Cedar, Mingo County—15 to 20 feet below the coal last described and 40 feet above the marine fossiliferous Eagle Limestone and Shale, attains a fair development, al-

³⁸I. C. White, Bull. 65, U. S. G. Survey, p. 177; 1891; and Vol. II, W. Va. Geol. Survey, pp. 592-3; 1903.

³⁹Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 210; 1914.

though there are no commercial mines on it at present. It is generally multiple-bedded, soft, columnar, ranging in thickness from 2 to 4 feet. As a separate minable bed, it appears to be confined to Clear Fork, Baileysville and Huff Creek Districts (Wyoming) and Sandy River and Browns Creek Districts (McDowell). Northeastward in Oceana District, the 15 to 20 feet of overlying shales thin down and disappear, thus permitting its junction with the Little Eagle of Mingo to form the true Little Eagle Coal of the Kanawha Valley. This feature may be observed at crop exposure along Huff Creek between the mouths of Coal and Slickrock Branches. Its area and crop are confined to practically the same regions as that outlined for the Eagle Coal. Its thickness and relative position in the rock column are exhibited in the general sections in Chapter IV for Mohawk and the Mouth of Longpole Creek. Its description in the immediately adjoining portions of Logan and Mingo, on pages 210 and 691-4 of the Report for the latter Counties, has a direct bearing on its condition in Wyoming and McDowell. Its thickness and character at country banks and prospect openings, and approximate minable area as outlined on Figure 28 along with that for the No. 3 Pocahontas Coal, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE GRAPEVINE SANDSTONE.

The Grapevine Sandstone of Hennen and Reger⁴⁰, belonging at its type locality—mouth of Grapevine Creek, Mingo County—in the interval separating the coal last described from the marine fossiliferous Eagle Shale and Limestone and ranging in thickness from 20 to 30 feet, is fairly persistent. Its thickness and stratigraphic position are exhibited in the general sections given in Chapter IV for Oceana, Wyoming, Mohawk, Panther and Paynesville. Its crop is confined to the western portions of each county, about midway between that outlined on Map II for the Eagle and Gilbert Coals. It is generally massive, grayish white, micaceous, frequently

⁴⁰Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 211; 1914.

attaining a thickness of 40 feet. No quarries were observed on it in the area under discussion, but stone from this ledge has proved satisfactory for foundations in the adjoining County of Logan.

THE EAGLE LIMESTONE AND SHALE.

The marine fossiliferous Eagle Limestone and Shale of White⁴¹, belonging at its type locality—Eagle, Fayette County—75 to 80 feet below the Eagle Coal and 55 to 60 feet below the Little Eagle bed, are very persistent in Wyoming and McDowell Counties. Their thickness and relative position in the rock column are exhibited in the general sections in Chapter IV for Clear Fork Gap, One Mile Southeast of Oceana, Wyoming (Dotson), Mohawk, and Douglas Station; and in the special section on preceding pages of this Chapter for Botsford. Its crop is confined to practically the same region as that outlined for the Grapevine Sandstone above. The reader is referred to pages 43 and 211-15 of the Report for Logan and Mingo Counties, immediately adjoining the territory of this Report on the west, for a description of this marine horizon and its correlation by tracing southwestward from its type locality on the Kanawha River to the Tug Fork region in southern Mingo County.

In Wyoming County, Oceana District, the crop of these beds was observed by the writer at Swope on the north bank of Road Fork of Huff, where the following section was measured:

	Feet.	Inches
Coal, Little Eagle, and concealed.....		
Shale, Eagle, dark, sandy, with marine fossils	10	0
Limestone, Eagle, dark, gray, hard, brittle, lenticular (1195' B.).....	0	10
Concealed		

In the eastern point of the same District, the crop of the Eagle Shale was observed by the writer along the hill road, $\frac{1}{4}$ mile west of Clear Fork Gap, at an elevation of 2585' B.; and again in the hill road a short distance east of the same

⁴¹I. C. White, Bull. 65, U. S. G. Survey, pp. 140 and 177; 1891; and Vol. II, W. Va. Geol. Survey, p. 593; 1903.

gap, at an elevation of 2630' B., where marine fossils are abundant, as exhibited in the section for Clear Fork Gap, page 63.

About 5 feet of this shale, with marine fossils abundant, is exposed at a bend in a trail on the north hillside of Clear Fork, 0.4 mile northeast of the mouth of Crane Fork, at an elevation of 2000' B., about 110 feet below a country bank in the Eagle Coal, as determined with aneroid by the writer.

It was also observed by the writer on the south hillside of Bans Branch, $1\frac{3}{4}$ miles south of Oceana, at an elevation of 1710' B., about 140 feet below an opening in the Eagle Coal, where 20 feet of black shale is exposed. Here, no marine shells were found, but some fossil worms were seen. Its interval below the coal last mentioned increases gradually southwestward across Wyoming from 110 to 115 feet at Clear Fork Gap to 175 feet at Botsford—see section for the latter point, page 134, and on Turkey Creek, Mingo County, to 198 feet by spirit-level, its stratigraphic position at the latter locality being shown in the War Eagle Section, pages 88-9, of the Logan-Mingo Report of the State Geological Survey.

In **McDowell County**, Sandy River District, the Eagle Shale was observed at crop exposures at several points in addition to those mentioned for the general sections above. In fact it is one of the most important key rocks in the western portions of each county, in determining the correlation of the members of the Kanawha Group. In the extreme southwestern edge of this District, the writer observed the crop of this shale, with marine fossils abundant, along the hill road on the head of Road Fork of Bull Creek, at an elevation of 1460' B., 75 feet above the blossom of the Lower War Eagle Coal.

Its crop is exposed in the hill road 1.8 miles due south of Iaeger, at an elevation of 1845' B., as determined by the writer, 50 feet below the blossom of the Cedar Coal, where it carries marine fossils and has a thickness of 25 feet.

It crops in the ridge road 3 miles southward near the school house on the head of Grapevine Branch, at an elevation of 2115' B., as determined by the writer. Here a thickness of 15 feet of black shale is exposed, carrying marine fossils.

The Eagle Shale crops in the road on the West Virginia-Virginia State Line in the southwest edge of Sandy River District, 0.2 mile due south of Paynesville, at an elevation of 2305' B., where the following section was measured with aneroid by the writer:

Paynesville Section.

	Thickness Feet.	Total Feet.
Sandstone, capping knob.....	15	15
Shale, buff	19.5	34.5
Coal, Little Eagle	1.5	36
Shale, buff	33	69
Coal, Cedar	2	71
Concealed	30	101
Shale, buff	20	121
Shale, black, marine fossils, Pelecypods, Eagle	10	131
Shale, buff, sandy	82	213
Coal, Lower War Eagle.....	3	216
Sandstone, massive, forms cliff, Upper Gil- bert		

This is the farthest point southward that this marine fossiliferous horizon occurs in West Virginia, as it passes into the air southeastward above the summits of the highest knobs along the State Line.

THE LITTLE CEDAR COAL.

The Little Cedar Coal of Hennen and Reger⁴², belonging at its type locality—near Delorme, Mingo County—immediately at the base of the last formation described and ranging in thickness from 6 to 24 inches, is fairly persistent, but does not attain minable dimensions and regularity. Its thickness and stratigraphic position are exhibited in the general sections in Chapter IV for Oceana—One Mile Southeast, and Mohawk; and in the special section of the Kanawha Group given on preceding pages of this Chapter for Crany.

This coal is 17 inches thick at its crop in the ridge road, near a school house, 2.3 miles northwest of Avondale, Sandy

⁴²Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 215-6; 1914.

River District (McDowell), at an elevation of 1875' B., as determined by the writer with aneroid, and belongs at the base of the Eagle Shale, and 15 to 20 feet above the Lower War Eagle Coal.

THE LOWER WAR EAGLE SANDSTONE.

The Lower War Eagle Sandstone of Hennen and Reger⁴³, belonging at its type locality—War Eagle, Mingo County—in the interval separating the coal last described and the Lower War Eagle Coal, and ranging in thickness from 20 to 40 feet, attains a fair development. It is generally flaggy to current-bedded, medium grained, micaceous, and frequently forms escarpments around the hillsides of western McDowell, its crop being confined to practically the same regions as that outlined for the Grapevine Sandstone on a preceding page. Its thickness and relative position in the rock column are exhibited in the general sections in Chapter IV for Clear Fork Gap in Wyoming County, and Wyoming (Dotson) in McDowell. No quarries were observed on it in the area under discussion.

THE LOWER WAR EAGLE COAL.

The Lower War Eagle Coal of White⁴⁴, belonging 5 to 10 feet below the last sandstone described, 256 feet below the Eagle ("Middle War Eagle") Coal, and 59 feet below the marine fossiliferous Eagle Shale at the type locality of the coal—on Turkey Creek near War Eagle, Mingo County—is very persistent and attains minable dimensions. It is generally overlain by 5 to 10 feet of black to cannelly slate, is multiple-bedded, soft, columnar, and ranges in thickness from 2 to 4 feet. Its dimensions and stratigraphic position are exhibited in the general sections in Chapter IV for Clear Fork Gap, Oceana—One Mile Southeast, Panther, Douglas Station, and Paynesville—Two Miles Northeast; and in the special section of the Kanawha Group on preceding pages of this

⁴³Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 216; 1914.

⁴⁴L. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 318 and 325; 1908.

Chapter for Botsford. Its area and crop are confined to the northwest portion of each County, or to practically the same regions as that outlined for the Grapevine Sandstone on a preceding page. Its description in the immediately adjoining portions of Logan and Mingo, on pages 216-7 and 695-707 of the Report for these Counties, has an important bearing on its condition in the area under discussion. It has never been mined on a commercial scale, unless the "Kidd* seam" in Fayette County is the same bed, but its thickness, composition and character at country banks, prospect openings and crop exposures, and its approximate minable area, as outlined on Figure 17, are described on subsequent pages of Chapter X, along with an estimate of its available tonnage by magisterial districts.

THE UPPER GILBERT SANDSTONE.

The Upper Gilbert Sandstone of Hennen and Reger⁴⁵, belonging at its type locality—Gilbert, Mingo County—1 to 5 feet below the coal last described and ranging in thickness from 40 to 50 feet, holds its normal development in Wyoming and McDowell, where it forms steep slopes and prominent escarpments around the hillsides wherever it outcrops, the latter feature following closely the same regions as that outlined for the Lower War Eagle Coal. Its thickness and relative position in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Baileysville, Wyoming (Dotson) Station, Panther, Groundhog Branch, Paynesville—Two Miles Northeast, and Paynesville—Two and One-Half Miles Northwest. In the southwestern half of Sandy River District, McDowell County, this stratum serves as a valuable key rock in tracing the measures from Panther and Iaeger to the West Virginia-Virginia State Line near Paynesville and Peapatch, the farthest southward point of its crop being at the summit of a knob in the extreme southeastern point of Sandy River District, one-fifth mile southwest of the latter post-office, at an elevation of 2870' B.

*Vol. II(A), W. Va. Geol. Survey, pp. 326, 330, 342; 1908.

⁴⁵Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 217-8; 1914.

It is generally massive, medium grained to coarse and pebbly, grayish white to brown, often attaining a thickness of 100 feet. No quarries were observed on it in either county, but, since it carries a comparatively high percentage of silica, it should crush into sand adapted to the manufacture of concrete, the numerous cliff exposures furnishing an inexhaustible supply along the valley walls of Guyandot River, below Baileysville; and Tug Fork, below Iaeger.

THE OCEANA LIMESTONE.

In the 15 to 40 feet of dark, flaggy and sandy shales intervening between the sandstone last described and the Glenalum Tunnel Coal below, there occurs at Oceana a dark gray, lenticular and calcareous stratum, ranging in thickness from 0 to 24 inches and belonging 35 feet above the coal last mentioned, that has not been previously described. It is herein designated the **Oceana Limestone**. Its relative position in the rock column is exhibited in the section for Oceana, page 61. The writer was inclined at first to correlate this horizon with the Eagle Limestone, but a long search in both the ledge and the accompanying shales at three widely separated exposures failed to reveal a single marine fossil, and later, the marine fossiliferous Eagle Shale was discovered 150 feet higher in the measures, 300 feet above the Gilbert Coal, the latter cropping 10 to 15 feet above the bed of Clear Fork at Oceana. It is barely possible that this limestone may belong at the same horizon as the marine fossiliferous **Dorothy Shale** of Krebs⁴⁶, the latter coming at its type locality—Dorothy, Raleigh County—125 feet below the Eagle Limestone. No marine fossils were found in the interval separating the Upper and Lower Gilbert Sandstones, although they may be present in scanty numbers. Dr. Price was able to find only one specimen in the Dorothy Shale at Dorothy after a long search, which is evidence that fossils are rare in this zone.

The following section was measured by the writer on the west hillside of Dry Branch, 0.6 mile due north of Oceana, at the outcrop of the Oceana Limestone:

⁴⁶C. E. Krebs, Raleigh County Report, W. Va. Geol. Survey; 1916.

	Feet.	Inches.
Sandstone, flaggy, dark, Upper Gilbert	10	0
Coal , bony, local	0	4
Shale, black, silicious, with iron ore nodules	25	0
Limestone , dark gray, cone-in-cone structure on the shell, lenticular, Oceana (1380'		
B.), 0" to	2	0
Shale, black, with iron ore nodules, to bed of Left Fork of Dry Branch.....	11	0

Although its accompanying dark, sandy shales were always present, the Oceana Limestone was not observed at the numerous exposures of its horizon in McDowell County.

THE GLENALUM TUNNEL COAL.

The Glenalum Tunnel Coal of Hennen and Reger⁴⁷, belonging at its type locality—Glenalum Junction, Mingo County—80 to 100 feet below the Lower War Eagle bed and immediately above the Lower Gilbert Sandstone, is very persistent and attains practically the same minable dimensions and regularity as the seam last mentioned. It is always multiple-bedded, soft and columnar, resembling very much in physical appearance the New River and Pocahontas types of coal. As frequently happens along Tug Fork in Mingo County, it is sometimes separated into two benches by 15 to 20 feet of dark, sandy shales, as at Oceana, where the lower has been mined at country banks for domestic fuel. Its thickness and stratigraphic position are exhibited in the general sections in Chapter IV for Oceana, Oceana—One Mile Southeast, Clear Fork Gap, Douglas Station, and Paynesville; and in the special section of the Kanawha Group on preceding pages of this Chapter for John O Branch. Its area and crop are confined to the northwest portion of each county, the latter following closely the same region as that outlined on Map II for the Gilbert Coal, since it belongs only about 100 feet above the latter bed. Its description in the immediately adjoining portions of Logan and Mingo, on pages 218-9 and 707-15 of the State Report for these Counties has a direct bearing on its condition in the area under discussion. It has never been mined commercially, but

⁴⁷Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 218-9 and 707-15; 1914.

its thickness, composition and character at country banks, prospect openings and crop exposures, and approximate minable area as outlined on Figure 18, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE LOWER GILBERT SANDSTONE.

The Lower Gilbert Sandstone of Hennen and Reger⁴⁸, belonging at its type locality—Gilbert, Mingo County—immediately below the coal last described and 20 to 40 feet below the Upper Gilbert Sandstone and ranging in thickness from 50 to 80 feet, is very persistent in the territory of this Report, and forms steep slopes and great cliffs around the hillsides wherever it outcrops, the latter feature being confined closely to the same region as that outlined for the Gilbert Coal on Map II. It is generally massive to heavy-bedded, medium grained to coarse and pebbly, grayish white to yellowish brown, frequently having a thickness of over 100 feet. Its thickness and relative position in the rock column are exhibited in the general sections in Chapter IV for Oceana, Oceana—One Mile Southeast, and Clear Fork Gap in Wyoming; and for Wyoming (Dotson) Station, Panther, Douglas Station, Johnnycake Branch, Bradshaw, and Groundhog Branch in McDowell County. In Oceana District (Wyoming), it is this stratum that forms the sheer cliff—about 50 feet in height—along the northwest hillside of Clear Fork, 1 mile southwest of Oceana, at an elevation of 1265' B., 25 feet above a crop exposure of the Gilbert Coal and 40 feet above the bed of the latter. In conjunction with the Upper Gilbert ledge, it proved a valuable key rock in the southwestern edge of Sandy River District (McDowell) in tracing the upper measures along the high dividing ridge forming the State Line, between Paynesville, and Bearwallow Knob, its crop on the summit of the latter being its farthest southward exposure in West Virginia, since it passes into the air beyond this point on the rapid southeast rise of the strata.

The following section, determined with aneroid by the

⁴⁸Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 219; 1914.

writer at the summit of the latter knob, is important in that the succession of members of the Pottsville at the junction of the Kanawha and New River Groups is shown at their farthest southward crop exposure in the State:

Bearwallow Knob Section.

	Feet.	Inches.
Sandstone, Lower Gilbert, coarse, brown, friable and pebbly, pebbles small and irregular in shape, from top of knob....	100	0
Coal, slaty, Gilbert "A"	0	9
Shale, buff to green, with sandstone	45	0
Coal blossom, Gilbert, thickness concealed..	0	0
Shale	10	0
Sandstone, Nuttall ("Dotson"), coarse, brown, friable, with small flat pebbles..	60	0
Coal, Douglas "A"	1	0
Shale and concealed	40	0
Coal, Douglas	2	0

No quarries were observed on the Lower Gilbert ledge, but, along the valley walls of Guyandot River, below Baileysville, and Tug Fork, below Iaeger, it carries a high percentage of silica and a comparatively low alumina content; hence, stone from it should crush into sand adapted to the manufacture of concrete for use in various forms of highway construction in western Wyoming and McDowell.

THE GILBERT "A" COAL.

Along the high ridge on the State Line in the southwestern edge of Big Creek District, between Peapatch P. O. and Bearwallow Knob, there occurs a thin, slaty and impure bituminous bed immediately at the base of the sandstone last described and 30 to 50 feet above the Gilbert Coal, that has not been previously described. In harmony with the rules of geologic nomenclature, it is herein designated the **Gilbert "A" Coal**. The section last given shows its stratigraphic position in this locality. It is too thin and impure to have any economic value; hence, further space will not be taken for its description.

THE GILBERT SHALE.

The roof shale of the Gilbert Coal in western Wyoming frequently carries marine fossils, being generally dark gray to black in color, and ranging in thickness from 2 to 10 feet. As it has not been previously described, it is herein designated the **Gilbert Shale** from its intimate association with the coal of the same name. In Oceana District (Wyoming) marine fossils were observed by the writer at this horizon at three different country banks in the Gilbert Coal near the head of Clear Fork, both above and below Knob Fork School House. They were also found in the roof shales of another opening of the same coal in Clear Fork District (Wyoming), on the east hillside of Walls Branch, 0.7 mile northwest of the mouth of Cedar Creek. Its thickness and character at these several openings are described in connection with the sections of the Gilbert Coal, published on subsequent pages in Chapter X.

THE GILBERT COAL.

The Gilbert Coal of Hennen and Reger⁴⁹, belonging at its type locality—Gilbert, Mingo County—15 to 25 feet below the base of the Lower Gilbert Sandstone and 5 to 10 feet above the Nuttall ("Dotson") Sandstone, has thickened to minable dimensions and regularity in the territory of this Report, where it is multiple-bedded, soft, and columnar, ranging in thickness from 2 to 4 feet. Its area and crop, as outlined on Map II in detail, are confined to the northwest halves of each County. Its thickness and stratigraphic position are exhibited in the general sections given in Chapter IV for Oceana and Saulsville in Wyoming, and for Wyoming (Dotson) Station, Douglas Station, Johnnycake Branch, and Harman Branch in McDowell County. In the Iaeger region it is known locally as the "Lick Branch" bed, from a tributary of Tug Fork to the northeastward on which it has been mined by the natives for domestic fuel. It has never been operated on a commercial scale, but its thickness, composition and character at country banks, prospect openings and crop ex-

⁴⁹Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 221-2; 1914.

posures, and approximate minable area as outlined on Figure 19, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage by magisterial districts. This coal, in conjunction with the overlying Glenalum Tunnel and Lower War Eagle beds and the underlying Douglas seam, has been a great aid in tracing the basal members of the Kanawha Group southwestward across the entire area under discussion.

AGE OF THE KANAWHA SERIES.

Fossil Flora.

As mentioned at the beginning of Chapter IV, the age of the Kanawha Group is probably contemporaneous with that of the Beaver Group of western Pennsylvania, comprising the whole of the Pottsville Measures as represented in the latter region. Mr. David White, at present Chief Geologist of the U. S. Geological Survey, has made a careful study of the fossil flora of the group as represented in the Kanawha Valley, and the results of his investigations have been re-published and commented on by I. C. White, State Geologist, in Volume II of the State Survey Reports, on pages 325-8 and 593-603, to which the reader is referred.

Fossil Fauna.

Since the publication in 1908 of Volume II(A) of the West Virginia Geological Survey Reports, eight additional marine fossiliferous horizons have been discovered by the members of the geologic staff. The following tabular statement, giving the intervals in feet of each from the top of the Pottsville Measures as exhibited in the General Section at the beginning of Chapter IV, pages 51-60, has been compiled for convenience of reference. The **Pelecypoda** and **Brachiopoda** predominate, although **Gasteropods** and **Crinoids** abound in some. These marine zones are evidence that the coal beds of the Kanawha Group were accumulated in great swamps that were frequently subjected to incursions of sea water from a neighboring bay or gulf.

Table of Marine Fossil Horizons, Kanawha Group.

	Intervals. Feet.
Kanawha Black Flint	100
Buffalo Limestone	435
Winifrede Limestone	590
Dingess Limestone and Shale	760
Seth Limestone	820
Campbell Creek Limestone	1117
Cannelton (Stockton) Limestone and Shale.....	1275
Roof Shale of Eagle Coal	1365
Roof Shale of Little Eagle Coal.....	1485
Eagle Limestone and Shale.....	1544
Gilbert Shale (Roof Shale of Gilbert Coal).....	1815

A careful collection of specimens from crop exposures of several of these horizons was made during the field season of 1914 by W. A. Price, Paleontologist for the Survey, and the results of his investigations will be published later. For additional information on the fossil fauna of the Kanawha Group in the southwestern portion of the State, the reader is referred to the County Reports for Kanawha, Logan and Mingo, and Boone.

CHAPTER VI.

STRATIGRAPHY---THE NEW RIVER GROUP.

GENERAL ACCOUNT.

The New River Group or Middle Pottsville Series of White¹, beginning at top with the Nuttall ("Dotson") Sandstone and extending down through the rock column to the top of the Flattop Mountain Sandstone, has a thickness of only about 700 feet at its type locality—along New River in Fayette and Raleigh Counties—as against 1300 feet for the same measures in the southwestern portion of McDowell County. This represents an even greater rate of expansion for these measures than found for the Kanawha Group between the same regions of the State. The character of the strata differs little from that along New River, generally consisting of heavy to current-bedded sandstones, medium grained to coarse, and pebbly, micaceous to quartzitic, grayish white to yellowish brown in color; coal beds, soft and columnar in type; impure fire clays; shales, both argillaceous and arenaceous, buff, gray and black in color; and only one marine fossiliferous horizon; namely, the Douglas Shale. The detailed crop of the Group is outlined on Map II. Sandstones predominate, constituting about 75 per cent. of the strata, as against 60 per cent. in the Kanawha Group. The coal beds have by far the greatest economic value, the formation holding nine (9) minable seams, the descriptions of which are given on subsequent pages in this Chapter and Chapter X.

As the sandstones of these measures run higher in silica and are consequently more quartzitic and harder than those of the Kanawha Group, their effect on the topography is more

¹I C. White, Bull. 65, U. S. G. Survey, pp. 202-3; 1891; and Vol. II(A), W. Va. Geol. Survey, pp. 13 and 179; 1908.

pronounced, in that long, persistent cliff exposures are quite common, a feature that greatly facilitates the tracing of its several members through the forested regions of Wyoming and McDowell Counties. The thickness and stratigraphic succession of the several members of this formation are shown in detail in the General Section of the Pottsville Measures, pages 51-60, along with that for the Kanawha and Pocahontas Groups.

LOCAL SECTIONS.

In addition to the sections of the New River Group published on preceding pages in Chapter IV, several will now be given by magisterial districts. Wherever possible, these were determined roughly along the strike of the strata in order to obtain true vertical measurements.

Baileysville District (Wyoming).

The following succession of the New River Group is obtained in the southeastern edge of Baileysville District by combining an aneroid section measured from the low gap on the Wyoming-McDowell County Line northward along the hill road on the head of Brier Creek, with the log of a diamond drill boring, sunk by J. B. B. Coal Co., the record of which was kindly furnished the Survey by Timothy W. Sprague, of Boston, Mass.:

Head of Brier Creek Section, Baileysville District.

	Thickness Feet.	Total Feet.	
Shale, from low gap	13½	13½	
Coal, laeger "A"	1½	15	15'
Sandstone, massive, Upper laeger	30	45	
Shale, sandy, dark, Upper laeger	15	60	
Coal, laeger	0	60	45'
Shale, sandy	20	80	
Coal, Lower laeger	0	80	20'
Sandstone, shaly	20	100	
Shale, dark, Lower laeger	45	145	
Sandstone, shaly	18½	163½	
Coal, local	1½	165	
Sandstone, Harvey	15	180	

	Thickness Feet.	Total Feet.	
Concealed	5	185	
Shale, dark, Sandy Huff	65	250	
Sandstone, Guyandot , to top of boring (28). (Continued with Log of Coal Test Boring No. 28 on Map II; elevation of well mouth, 1563' L.):	20	270	190'
Casing (through alluvial drift).....	10 0	280 0	
Sandstone, Guyandot	25 0	305 0	35'
Dark shale.....	18 0	323 0	
Sandy shale.....	10 0	333 0	
Sandy shale and limestone partings.....	24 1	357 1	
Blue shale and limestone partings.....	10 5	367 6	
Black slate	1 2	368 8	
Coal .....2' 8 " } Sewell or			
Coal, slaty.....0 4½ } "Davy"	3 7	372 3	67' 3"
Coal .....0 6½ } (1461' L.)			
Slate	0 2	372 5	
Sandy shale.....	1 7	374 0	1' 9"

Center District (Wyoming)

The following section was measured by the writer with aneroid in the western edge of Center District, Wyoming County, northward down the south hillside of Guyandot River, 0.2 mile southwest of the mouth of Big Branch:

Section Two Miles Northeast of Fanny, Center District.

	Thickness Feet.	Total Feet.	
Concealed, mostly shale	50	50	
Sandstone, gray, white	10	60	
Concealed	20	80	
Sandstone, flaggy	40	120	
Concealed and shale	50	170	
Sandstone, gray, white	55	225	
Concealed	30	255	
Concealed, mostly shale	70	325	
Concealed on bench	10	335	
Sandstone, concealed and slate, sandy.....	42	377	
Coal, gas, soft.....0' 8½" } Sewell ...	3	380	380'
Coal, gas, gray, hard..0 1½ } (1385' B.)			
Coal, gas, soft, columnar.2 2 }			
Slate and concealed and unrecorded.....	68	448	
Sandstone, massive, Upper Raleigh	40	488	
Concealed and fire clay	10	498	
Shale, flaggy and sandy	35	533	

			Thickness Feet.	Total Feet.	
Coal, gas, $\frac{1}{2}$ " slate near middle.....0'	5	"			
Shale and shaly sand- stone .....9	11				
Coal, gas, soft .....0	5				
Shale, gray .....0	$0\frac{1}{4}$				
Coal, gas, soft.....1	$2\frac{3}{4}$				
Shale and concealed to bed River		of	45	590	45'
		Little Raleigh....	12	545	165'
		Coal (1250' B.)			

Three miles eastward in the same district, the writer measured the following section of the New River Group southward to the bed of Guyandot River. The portion above the blossom of the Sewell Coal was determined along the road leading down the west hillside of Williamson Branch; and that below the same member, down the north hillside of the former stream. Owing to the rise of the strata in this direction, the intervals are less than they should be, but the correlations of the Iaeger, Sewell and Beckley Coals are accurate:

Pineville-Williamson Branch Section, Center District.

	Thickness Feet.	Total Feet.	
Sandstone, Upper Iaeger, flaggy, gray and brown, medium grained, micaceous from top of knob.....	65	65	
Concealed, with sandstone	70	135	
Coal blossom, heavy, Iaeger (1980' B.).....	..	135	135'
Concealed, mostly shale	5	140	
Shale	10	150	
Sandstone	10	160	
Shale, brown, sandy, pencil	15	175	
Concealed	5	180	
Shale and flaggy sandstone	20	200	
Concealed	5	205	
Shale, sandy, dark gray, pencil.....	50	255	
Concealed, mostly shale	20	275	
Shale, brown, sandy	15	290	
Concealed	5	295	
Sandstone, greenish gray, micaceous, flaggy	20	315	
Shale, sandy and buff	55	370	
Concealed	55	425	
Sandstone, flaggy	5	430	
Concealed	10	440	
Sandstone, gray, white, massive, Lower Guy- andot	30	470	
Concealed	5	475	
Coal blossom, Sewell (1640' B.).....	0	475	340'

	Thickness Feet.	Total Feet.	
Fire clay and shale	5	480	
Sandstone, massive, hard, forms grayish white cliff, Upper Raleigh	45	525	
Concealed	12	537	
Shale, brown	10	547	
Sandstone, massive and flaggy, current bed- ded, micaceous, medium grained, brown and greenish gray, Lower Raleigh	90	637	
Concealed and sandstone	17.5	654.5	
Coal , soft, columnar, Beckley (1458' B.)....	2.5	657	182'
Slate and unrecorded, mostly concealed (by hand-level) to Coal Test Boring No. 17 on Map II	193	750	
Concealed to bed of Guyandot River, just below mouth of Williamson Branch...	12	762	205'

Sandy River District (McDowell).

Slightly over 50 per cent. of the surface rocks of Sandy River District, McDowell County, belong in the New River Group. The following section of these measures was determined by the writer with aneroid southward and eastward to the N. & W. Railway grade at Wilmore. The portion above the top of the Guyandot Sandstone was measured mostly down the north hillside of Tug Fork, one-sixth mile above the mouth of Dry Branch; and that below the same datum, was obtained from exposures eastward along the grade to Wilmore. The section is very important, in that the true position of the Iaeger Coal is shown with reference to the Sewell ("Davy") bed:

Wilmore Section, Sandy River District.

	Thickness Feet.	Total Feet.	
Shale, dark	5.0	5.0	
Coal , gas.....1' 0" } Iaeger (1' 8").....	1.5	6.5	6.5'
Bone .....0 2 } (1310' B.)			
Coal , gas ....0 6 }			
Concealed (Sandy Huff Shale 60')	171.5	178.0	
Coal , Castle	0.5	178.5	172.0'
Sandstone, Guyandot , making cliff.....	59.5	238.0	
Coal , Sewell "B" (0' 0" to 0' 11").....	0.5	238.5	60.0'
Shale, dark, sandy, and sandstone, dark, shaly, laminated	45.0	283.5	
Coal , Sewell "A" (0' 6").....	0.5	284.0	45.5'
Sandstone, massive, Lower Guyandot	45.0	329.0	

	Thickness Feet.	Total Feet.	
Coal, with 2" parting 10" below top, Sewell ("Davy")	2.5	331.5	47.5'
Sandstone, massive ....22.5'	} Welch	37.5	369.0
Sandstone, shaly, laminated .....15.0			
Shale, sandy	15.0	384.0	
Coal, Welch (0' 4").....	0.3	384.3	52.8'
Fire clay shale, sandy	2.0	386.3	
Sandstone, massive, gray, white, to N. & W. Ry, grade at Wilmore Station, Upper Raleigh	15.0	401.3	

Three to four miles westward in the same district, the following section, measured with hand-level by the writer on the east bank of Tug Fork, 0.4 mile due north of the mouth of Dry Fork, exhibits the thickness, multiple-bedded character and stratigraphic position of the Iaeger and Lower Iaeger Coals at their type locality:

Section 0.4 Mile N. W. of Iaeger, Sandy River District.

	Thickness Feet.	Total Feet.	
Shale, Upper Iaeger , and concealed.....			
Sandstone	5	5	
Shale, sandy, buff, fossil plants.....	5¼	10¼	
Coal, splint .....2' 3" } Iaeger	} (980' B.)..	3	13¼' 13¼'
Slate, black, bony.....0 2			
Coal .....0 7	} Lower	3¾	62 48¾'
Sandstone, laminated, base massive, upper portion medium grained, micaceous, Middle Iaeger			
Coal .....1' 2 " }			
Shale, gray .....2 5½ } Iaeger ...			
Coal .....0 1½ } (3' 9")			
Fire clay shale	1	63	
Sandstone, Lower Iaeger	6	69	

The following section was measured with aneroid by the writer from the summit of a high knob down the south hill-side of Tug Fork to the Norfolk & Western Railway grade, just above Marytown:

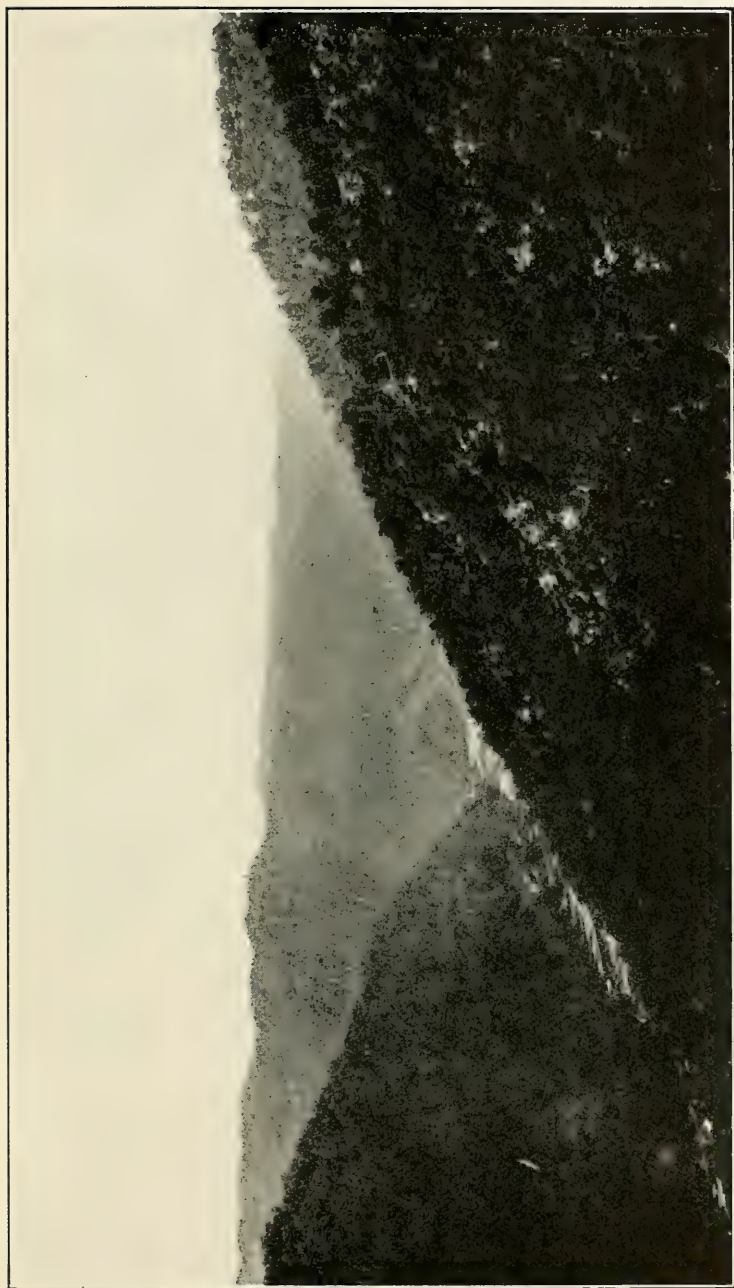


PLATE X—Looking westward down Tug Fork from point due east of mouth of Shortpole Branch at Douglas, McDowell County, showing topography of the Kanawha and New River Groups.

	Thickness Ft. In.	Total Ft. In.	
Coal, Douglas, "Red Ash", at opening of Lone Jack Coal Mining Co.....	2 6	515 0	190'
Slate	1 0	516 0	
Sandstone, massive, making great cliff, Lower Nuttall	65 0	581 0	
Concealed	50 0	631 0	116'
Sandstone, Panther	35 0	666 0	
Concealed	10 0	676 0	
Sandstone, massive, making cliff, Up- per laeger	45 0	721 0	
Concealed	72 0	793 0	
Shale, dark, Upper laeger	8 0	801 0	
Sandstone, shaly bottom, massive at top	7 0	808 0	
Coal opening (closed), laeger	3 0	811 0	180'
Shale and concealed along incline to bed of Dry Fork.....	195 0	1006 0	195'

Slightly over 8 miles southeastward in the same district, the following section of the New River Rocks, reaching almost up to the base of the Kanawha Group, was measured with aneroid by the writer southwestward down a long point to the bed of Dry Fork, $\frac{3}{4}$ mile west of Atwell. The intervals are greater than they should be, owing to the dip of the strata in this direction. The section is interesting, in that the true position of the great Harvey Conglomerate is exhibited, as also the undoubted Sewell and Welch Coals thinned below minable dimensions:

Section $\frac{3}{4}$ Mile West of Atwell, Sandy River District.

	Thickness Feet.	Total Feet.	
Unrecorded from top of knob.....	230	230	
Shale, flaggy, sandy.....	20	250	
Concealed and shale, buff, sandy, (Lower Douglas Coal horizon).....	20	270	270'
Sandstone, making cliff..25' }			
Concealed 5 { Panther	70	340	
Sandstone, making cliff, medium grained.....40 }			
Concealed and shale.....	35	375	
Sandstone, massive, gray, brown, making cliff, Upper laeger	55	430	
Concealed, mostly dark shale.....	20	450	180'
Sandstone, platy, medium grained, making cliff, Middle laeger	40	490	
Concealed and shale.....	10	500	

	Thickness Feet.	Total Feet.	
Sandstone, coarse, pebbly at base, forms cliff, Harvey Conglomerate.....	115	615	
Concealed, mostly shale, Sandy Huff.....	50	665	
Sandstone, platy, making cliff, Guyandot....	55	720	
Concealed, mostly hard, buff shale.....	15	735	
Sandstone, cliff, platy, brown.....	30	765	
Concealed	25	790	
Concealed, mostly shale, sandy, hard.....	15	805	
Sandstone, Lower Guyandot.....	24	829	
Coal, Sewell, ("Davy"), (1300' B.).....	1	830	380'
Sandstone, cliff, brown, medium grained, Welch	55	885	
Shale, dark and buff.....	7	892	
Coal, bony, Welch.....	1	893	63'
Shale, gray.....	2	895	
Shale, dark, laminated, to railroad grade....	20	915	
Concealed to Dry Fork.....	35	950	

In the southwestern portion of the same district, the following section, measured along a ditch exposure at the mouth of Coalbank Fork of Meethouse Fork of Panther Creek and kindly furnished the Survey by W. D. Kroll of the Lathrop Coal Company at Panther, West Virginia, exhibits the true relative position of the Douglas and Lower Douglas, as also the several Iaeger beds:

Coalbank Fork of Meethouse Section, Sandy River District.

	Thickness Feet.	Total Feet.	
Concealed and slate.....			
Coal, Douglas (1940' B.).....	3.5	3.5	3.5'
Sandstone, slate and shale.....	102.5	106.0	
Coal, Lower Douglas.....	2.5	108.5	105.0'
Sandstone, slate and sandstone.....	113.0	221.5	
Coal, 1' 6" to 2' 0", Iaeger "B".....	2.0	223.5	115.0'
Sandstone, slate and sandstone.....	43.5	267.0	
Coal, (1' 0" to 1' 6"), Iaeger "A".....	1.5	268.5	45.0'
Sandstone, slate and sandstone.....	43.5	312.0	
Coal, Iaeger (1627' L.).....	4.5	316.5	48.0'

DESCRIPTION OF FORMATIONS.

A detailed description of the members of the New River Group will now be given in descending order, their succession being exhibited in the General Section of the Pottsville Measures, pages 51-60, along with that for the Kanawha and Pocahontas Groups.

is often single-bedded, but sometimes multiple, soft, columnar, ranging in thickness from 2 to 3 feet. Its thickness and stratigraphic position are exhibited in the general sections of the Pottsville Measures in Chapter IV for Clear Fork Gap and Baileysville in Wyoming; and for Panther, Douglas Station, Johnnycake Branch, Harman Branch, Avondale, and Bradshaw; and in the special sections of the New River Group given on preceding pages of this Chapter for Iaeger—1.2 miles Southeast, and Coalbank Fork. Its crop is confined to practically the same regions as that outlined on Map II for the Gilbert Coal.

In Wyoming County the Douglas Coal has been opened by the natives for domestic fuel on the head of Clear Fork in the northeastern end of Oceana District, and in the southern half of Baileysville District and on the waters of Little Huff Creek in Huff Creek District. The same is true over the major portion of Sandy River District (McDowell). It is this seam that is being operated on the west hillside of Dry Fork by the Lone Jack Coal Mining Co. (No. 25 on Map II), as shown by the section given for Iaeger—1.2 miles S. E.

Its thickness, character and composition at the commercial mines, country banks and prospect openings, and approximate minable area, as outlined on Figure 20, are described on subsequent pages of Chapter X, along with an estimate of its available tonnage.

THE LOWER NUTTALL SANDSTONE.

Immediately below the last coal described belongs the **Lower Nuttall Sandstone** mentioned above under the description of the Nuttall ("Dotson") ledge and suggested as being the basal division of the Nuttall Sandstone proper of Fayette County. It is generally heavy to current-bedded, medium to coarse grained, often conglomeratic, grayish white to yellowish gray in color, and ranging in thickness from 50 to 100 feet. Its character and stratigraphic position are exhibited in the general sections of the Pottsville Measures in Chapter IV for Panther, Douglas Station, Iaeger, Avondale, Groundhog Branch, Hite Fork, and Paynesville N. E.; and in the special section of the New River Group on a preceding page of this

Chapter for Iaeger—1.2 Miles S. E. It forms steep slopes and great cliffs around the hillsides of both counties wherever it outcrops, the latter feature following closely the same regions as outlined on Map II for the Gilbert Coal, as it belongs only 125 to 150 feet below the latter bed.

In Wyoming County, southeast of Oceana, it forms great cliffs close down along Clear Fork to near the mouth of Toney; and Laurel, to Jesse. Its cliff-forming character on down Clear Fork, below Oceana, to its mouth and along the Guyandot, between Simon and Justice, is described on a preceding page under the account of the Nuttall ("Dotson") Sandstone. It is also this stratum that forms the first line of cliffs above the bed of Guyandot River southeastward from the mouth of Clear Fork to the mouth of Moccasin Branch, 1.5 miles southwest of Baileysville, where it frequently carries large, white quartz pebbles, ovoidal in shape, and $\frac{1}{4}$ to $\frac{3}{4}$ inch in diameter. In the eastern point of Clear Fork District, it forms the bed of McDonald Mill Creek for two miles above its mouth, and it is this sandstone that is indirectly responsible for the wide bottoms prevailing along Clear Fork, between Oceana and Elklick, as suggested under the description of the latter stream, page 27.

In McDowell County the Lower Nuttall Sandstone has about the same development as in Wyoming, as may be readily seen in the general sections mentioned above and to which reference is made for information in regard to this stratum in the former area. No quarries were observed on it, but, owing to its high silica content, stone from this ledge should crush into sand adapted to the manufacture of concrete for use in the various forms of highway construction that might be undertaken in the western half of the territory of this Report. Cropping low down near drainage in this locality, it is easily the most accessible ledge for this purpose.

THE DOUGLAS SHALE.

Immediately at the base of the last sandstone described and directly above the Lower Douglas Coal, there occurs 10 to 15 feet of dark to black, sandy shale, frequently carrying a marine fauna that has not been previously described. Marine

ter for Iaeger—1.2 Miles S. E., and Atwell, all in McDowell County. In the General Section of the Pottsville Rocks, pages 51-60, its correlation is suggested with the upper portion of the “Dismal Conglomerate” of Campbell⁵, and, as mentioned above under the account of the Lower Douglas Coal, it may represent the “Sharon Conglomerate” of western Pennsylvania. In Wyoming and McDowell, this stratum ranges in thickness from 50 to 100 feet, and carries large, white, quartz pebbles, ovoidal and rounded in shape, that attain 1½ inches in diameter at a crop exposure on the McDowell-Buchanan County Line, 1.8 miles southeast of the crest of Bearwallow Knob (see section for 2 Miles East of latter point, page 119). In Clear Fork District (Wyoming), it forms the great cliff in conjunction with the Lower Nuttall Sandstone, extending almost 150 feet sheer above the bed of Guyandot River, just above the mouth of Long Branch. In Sandy River District (McDowell), it is a prominent cliff-maker along the valley walls of Tug Fork, above Panther, and Panther Creek from ½ mile southwest of the latter point to its headwaters. Its crop may be closely approximated in the region of its occurrence, as it belongs only 250 to 275 feet below the Gilbert Coal, that for the latter bed being shown in detail on Map II.

No quarries were observed on this ledge in either county, but, owing to its high silica content, stone from it should crush into sand adapted to the manufacture of concrete, the many cliff exposures close down near drainage furnishing an inexhaustible supply.

THE IAEGER “B” COAL.

In the southwest portion of Sandy River District (McDowell), there occurs a thin, slaty, sulphurous and bituminous stratum, ranging in thickness from 12 to 24 inches, 100 to 115 feet below the Lower Douglas Coal and 100 feet above the Iaeger bed, that has not been previously described. It is herein designated the **Iaeger “B” Coal** from its association as the second seam above the Iaeger bed proper in this region. Its thickness and stratigraphic position are exhibited in the gen-

⁵M. R. Campbell, Tazewell Folio No. 44, U. S. G. Survey; 1898.

eral sections of the Pottsville Measures given in Chapter IV for Bradshaw and Paynesville N. E.; and in the Coalbank Fork section, on a preceding page of this Chapter, where it is shown to belong in the interval separating the Panther and Upper Iaeger Sandstones. It was only observed in the southwest portion of Sandy River District (McDowell), and even here it is too thin, irregular and impure to warrant further description.

THE UPPER IAEGER SANDSTONE.

At 60 to 70 feet above the Iaeger Coal at Iaeger, McDowell County, there occurs a massive to current-bedded, medium grained, grayish white to brown, and arenaceous cliff, ranging in thickness from 30 to 50 feet and belonging about 175 feet below the Douglas Coal, that has not been previously described. It is herein designated the **Upper Iaeger Sandstone** in contradistinction to the Middle and Lower Iaeger Sandstones, cropping immediately below the former coal at this place. Its thickness and relative position in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Baileysville, Maben, Pineville—Sugar Run, Panther, Douglas Station, Iaeger, Johnnycake Branch, Marytown, Cub Branch—Pando, Avondale, Bradshaw, and Bearwallow Knob—East; and in the special sections of the New River Group on preceding pages of this Chapter for Pineville—Williamson Branch, Iaeger—1.2 Miles S. E., and Atwell. Its outcrop follows closely the same region as that outlined for the Iaeger Coal on Map II. In **Wyoming County**, it appears to be this stratum that forms the cliff 30 to 40 feet in height on the south hillside of Guyandot River, $\frac{3}{4}$ mile southwest of Baileysville, 40 to 50 feet above the bed of the latter stream. In the same region it forms the shoals of Guyandot, $\frac{1}{4}$ mile below the mouth of Pigeon Creek. In **McDowell County**, the Upper Iaeger Sandstone forms the cliffs 60 to 70 feet in height along the N. & W. Railway grade at the mouth of War Branch, 2.3 miles northwest of Iaeger. Southwestward from this stream along the same grade it forms prominent escarpments to and beyond the mouth of Horse Creek, and passes below the bed of Tug Fork a short distance above

waters of Clear Fork, McDowell, in the vicinity of Coalwood (see revised section for latter point, page 108. The Iaeger Coal is not operated commercially in the State, but it has been mined by natives for local domestic fuel in Center District (Wyoming), and Sandy River District (McDowell) along Tug Fork at Iaeger, and southeastward from the latter point along Dry Fork. Its thickness, character and composition at these country banks, prospect openings and crop exposures, and approximate minable area, as outlined on Figure 22, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE MIDDLE IAEGER SANDSTONE.

In the interval separating the coal last described from the underlying Lower Iaeger bed there belongs at Iaeger, McDowell County, a massive, medium grained to coarse, grayish white to light gray and arenaceous stratum, ranging in thickness from 30 to 40 feet and frequently forming sheer cliffs, that has not been previously described. It is herein designated the **Middle Iaeger Sandstone** on account of its association between the Upper and Lower Iaeger ledges cropping in the hills at the same place. It forms steep slopes and prominent cliffs along the valley walls of Tug Fork and Dry Fork, east and southeast of Iaeger, respectively. Its thickness and relative position in the rock column are exhibited in the general sections of the Pottsville Series given in Chapter IV for Panther, Iaeger, Avondale, Bradshaw, and Hite Fork; and in the special sections of the New River Group on preceding pages of this Chapter for Iaeger—0.4 Mile N. W., Atwell, and Marytown. Its outcrop follows closely the same region as that outlined on Map II for the Iaeger Coal, since it belongs immediately below the latter bed. No quarries were observed on this ledge in either county, but it is very similar in character to the Upper Iaeger Sandstone and should be adapted to the same purposes as suggested for the latter stratum on a preceding page.

THE LOWER IAEGER COAL.

At 45 to 50 feet below the Iaeger Coal and immediately at the base of the sandstone last described, there occurs at

Iaeger, McDowell County, a thin, multiple-bedded, soft, bituminous stratum, that has not been previously described. It is herein designated the **Lower Iaeger Coal** from its association below the former seam at their common type locality. Its thickness and stratigraphic position are exhibited in the general sections in Chapter IV for Iaeger, and Bearwallow Knob—2 Miles East; and in the special sections of the New River Group on preceding pages of this Chapter for Head of Brier Creek, and Iaeger—0.4 Mile N. W. It is too thin and irregular in its occurrence to be of any economic importance, but is of scientific interest, in that its presence serves as an additional aid in prospecting for the more valuable Iaeger bed.

THE LOWER IAEGER SANDSTONE.

At 1 to 5 feet below the coal last described in its type locality—Iaeger, McDowell County—there occurs a massive to flaggy, medium grained, micaceous, gray to brown and arenaceous stratum, ranging in thickness from 20 to 30 feet, that has not previously been named. It is herein designated the **Lower Iaeger Sandstone** from its occurrence below the Upper and Middle ledges at their common type region. Its thickness and relative position in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV, and in the Marytown Section, page 177. No quarries were observed on this ledge, nor does it appear to be so prominent a cliff-maker as the two ledges last mentioned.

THE LOWER IAEGER SHALE.

Immediately below the last sandstone described, there occurs a dark gray, argillaceous and laminated stratum, ranging in thickness from 30 to 40 feet at an exposure along the Norfolk & Western Railway, $\frac{1}{4}$ mile northeast of Iaeger, that has not been previously named. It is herein designated the **Lower Iaeger Shale** on account of its association 90 to 100 feet below the Upper Iaeger Shale at their common type locality. Its thickness and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Panther, Avondale and Bradshaw; and in the special sec-

served on this ledge, but it is very similar in character to the Lower Nuttall Sandstone and should be adapted to the same uses, its great cliff exposures along the valley walls of Tug and Dry Forks furnishing an inexhaustible supply of quarry rock *in situ*.

THE SANDY HUFF SHALE.

The 40 to 50 feet of interval separating the formation last described and the great Guyandot Sandstone below is occupied by a dark gray, laminated and argillaceous bed at its crop exposure along the Norfolk & Western Railway grade at the mouth of Sandy Huff Branch of Tug Fork in Sandy River District (McDowell). As this stratum has not been previously described, it is herein designated the **Sandy Huff Shale**. Its thickness, character and stratigraphic position are exhibited in the general sections of the Pottsville Measures in Chapter IV for Panther, Cub Branch—Pando, Avondale, and Dry Fork Station; in the special sections of the New River Group given on preceding pages of this Chapter for Atwell and Marytown; and in the log of Coal Test Boring No. 6 on Map II, given in Chapter X. It frequently happens that this shale is entirely cut out by the excessive development of the Harvey Conglomerate. When typical it is very similar in physical appearance to the Upper and Lower Iaeger Shales, cropping in the hills above it in the Sandy Huff Branch region. A sample for chemical analysis and another large sample for burning tests were collected by Gawthrop from its exposure along the railway mentioned above, $1\frac{3}{4}$ miles northeast of Iaeger, the composition and character of which are described on subsequent pages in Chapter XI under "Stratified Shales."

THE CASTLE COAL.

Immediately at the base of the formation last described and directly above the great Guyandot Sandstone, there belongs a thin, slaty, soft, bituminous stratum, seldom exceeding one foot in thickness, near Castle P. O. in the northeasterly edge of Center District, Wyoming County, that has not been previously described. It is herein designated the **Castle Coal** from this point. Its thickness and relative position in the rock

column are exhibited in the General Sections of the Pottsville Measures given in Chapter IV for Saulsville and Coalwood; in the special section of the New River Group, on preceding pages of this Chapter for Wilmore; and in the logs of Coal Test Borings Nos. 6 and 9 on Map II, in Chapter X. It is too thin and irregular to have any economic importance, so that further space will not be given for its description.

THE GUYANDOT SANDSTONE.

The Guyandot Sandstone of Campbell⁸, belonging at the type locality recognized in this Report—on Laurel Fork of Guyandot River, 1 mile southwest of McGraw, Wyoming County—60 to 75 feet above the Sewell Coal and ranging in thickness from 50 to 100 feet, is very persistent and proved a valuable key-rock in tracing the measures southwestward across the western half of the territory of this Report. Here it is massive to current-bedded, medium grained to coarse, sometimes conglomeratic, grayish white in color, generally forming steep slopes or great sheer cliffs wherever it outcrops. In the citation noted, Campbell has erroneously attributed this sandstone as being particularly heavy along the Guyandot River between Pineville and Gilbert, when in fact it passes below the bed of the latter stream on the rapid northwest dip of the strata about half way between these points, at Baileysville. Its thickness, character and stratigraphic position are exhibited in the General Sections of the Pottsville Measures given in Chapter IV for Baileysville, Maben, Pineville—Sugar Run, Little Whiteoak Creek, Panther, Bradshaw, Hite Fork, Cub Branch—Pando, Welch and Dry Fork Station; in the special sections of the New River Group, on preceding pages of this Chapter for Brier Creek, Wilmore, Atwell, and Marytown; and in the logs of Coal Test Borings Nos. 1, 5, 6, 7, 8, 9, 27, 29, 48, 50, and 51 on Map II, given in Chapter X. Since its interval above the Sewell ("Davy") Coal seldom exceeds 100 feet, its outcrop follows closely the same regions as that outlined for the latter bed on Map II. Southeastward along Tug Fork in McDowell this stratum first emerges above drain-

⁸M. R. Campbell, Raleigh Folio No. 77, U. S. G. Survey; 1902.

age about 2 miles above Iaeger, being a prominent cliff-maker $\frac{1}{4}$ mile northwest of Wilmore and on southeastward to the vicinity of Welch. The same is true along the valley walls of Dry Fork from a point 2 to 3 miles above Iaeger to near War. No quarries were observed on this sandstone, but it is very similar in character to the Lower Nuttall ledge, and should be adapted to the same purposes as described for it on a preceding page of this Chapter. The great cliff exposures at the points mentioned above would furnish an inexhaustible supply of stone.

THE SEWELL "B" COAL.

At 0 to 5 feet below the sandstone last described and 75 to 100 feet above the Sewell Coal in southeastern Wyoming and central McDowell, there belongs a multiple-bedded, soft, columnar and bituminous stratum, ranging in thickness from 1 to 5 feet, that has been erroneously referred to the Iaeger bed in a former State Report⁹. As mentioned under the description of the latter seam on page 189, it belongs 250 to 275 feet higher in the rock column, so that the first mentioned stratum is herein designated the **Sewell "B" Coal** from its association as the second vein above the Sewell proper. The following is a typical section of the bed in the region of its best development on the waters of Pinnacle Creek, Wyoming County:

			Ft.	In.
Coal, soft, columnar, 2' to.....	2'	4"		
Slate, dark gray, with coal streaks, 4"				
to	0	10		
Coal, soft, columnar, 18" to.....	1	10	5	0

Its thickness, character and stratigraphic position are exhibited in the general sections given in Chapter IV for Little Whiteoak Creek, Panther, Harman Branch, Coalwood, and Dry Fork Station; in the special section of the New River Group, on preceding pages of this Chapter for Wilmore; and in the logs of Coal Test Borings Nos. 5-9, 44, 45 and 50 on Map II, in Chapter X. It has never been mined commercially in the State, but its thickness and character at country banks,

⁹I. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 251-2; 1908.

prospect openings and crop exposures, and approximate minable area as outlined on Figure 5, along with that for the No. 5 Block Coal, are described on subsequent pages in the Chapter last mentioned, along with an estimate of its available tonnage.

THE SEWELL "A" COAL.

At 20 to 30 feet below the bed last described and 30 to 50 feet above the Sewell Coal proper, there occurs a thin, double-bedded, soft, columnar and bituminous stratum, seldom exceeding one foot in thickness, that has not been previously named. It is herein designated the **Sewell "A" Coal** from its association as the first bed above the Sewell seam proper. Its thickness and relative position in the rock column are exhibited in the general sections in Chapter IV for Bradshaw and Dry Fork Station; in the special section for Wilmore on preceding pages of this Chapter; and in the logs of Coal Test Borings Nos. 5-9 and 50 on Map II, given in Chapter X. As it belongs so near the Sewell Coal, its outcrop follows very closely the same regions as outlined for the latter bed on Map II.

The following section was measured at an opening in what appears to be this bed in the extreme southwestern edge of Big Creek District (McDowell), $\frac{1}{2}$ mile S. 10° to 15° W. of Coal Test Boring No. 104 on Map II:

	Ft.	In.
Concealed		
Sandstone	2	0
Shale, bluish gray, with plant fossils.....	4	0
Coal, soft, columnar, Sewell "A".....	2	2
Slate		

This coal has never been mined commercially in the State, and within the area under discussion it is too thin and irregular to have any economic importance. The interval separating it from the overlying Sewell "B" Coal is usually occupied by dark, sandy, flaggy and laminated shale.

THE LOWER GUYANDOT SANDSTONE.

Immediately below the Sewell "A" Coal and 0 to 5 feet above the Sewell bed proper, there belongs a very persistent,

massive to current-bedded, medium grained, grayish white to light gray and arenaceous stratum, ranging in thickness from 20 to 50 feet and forming steep slopes and cliffs along the crop of the Sewell Coal, that has not been previously described. It is herein designated the **Lower Guyandot Sandstone** from its association 20 to 40 feet below the Guyandot Sandstone proper. Its thickness and stratigraphic position are exhibited in the general sections given in Chapter IV for Maben, Pineville—Sugar Run, Little Whiteoak Creek, Whiteoak Branch, Panther, Bradshaw and Welch; in the special sections of the New River Group, on preceding pages of this Chapter for Pineville—Williamson Branch, Wilmore, Atwell, and Marytown; and in the logs of Coal Test Borings Nos. 1, 3, 7, 8, 9 and 10 on Map II, in Chapter X. It is not so prominent a cliff-maker as the Guyandot ledge, but it is very similar in character, although not quite so coarse and not often pebbly. No quarries were observed on it in either county, but its numerous cliff exposures should furnish a large supply of stone that would crush into sand adapted to various forms of highway construction in the immediate localities of its crop.

THE SEWELL ("DAVY") COAL.

The Sewell (Nuttall) Coal of White¹⁰, belonging at its type locality—Sewell Mountain, Fayette County—about 300 feet below the Nuttall Sandstone and 60 to 80 feet above the Upper Raleigh Sandstone, is very persistent in the territory of this Report, where it is generally multiple-bedded, soft, and columnar, ranging in thickness from 0 to 5 feet. It is the same as the "**Davy**" bed of McDowell and is one of the most important key-rocks of either county. The **green** structure contours on Map II, covering that portion of the area lying west of the 1000-foot level of the No. 3 Pocahontas seam, are based on this coal, and its detailed crop is exhibited on the same Map. The following section is typical of this bed where it attains minable dimensions:

¹⁰I. C. White, *The Virginias*, pp. 7-16; January, 1885; Bull. 65, U. S. G. Survey, p. 197; 1891; and Vol. II, W. Va. Geol. Survey, pp. 657-665; 1903.

			Ft.	In.
Coal, soft, columnar, 15" to.....	1'	6"		
Slate, black, with fossil plants, 2" to..	0	6		
Coal, soft, columnar, 20" to.....	2	0	4	0

The lower bench is generally thicker than the upper, a feature just opposite to that found in connection with the Sewell "B" bed. Its character and stratigraphic position are exhibited in the general sections given in Chapter IV for Maben, Pineville—Sugar Run, Little Whiteoak Creek, Whiteoak Branch, Cub Branch—Pando, Welch, and Coalwood; in the special sections of the New River Group, on preceding pages of this Chapter for Brier Creek, Fanny—2 Miles N. E., Pineville—Williamson Branch, Wilmore, Atwell, and Marytown; and in the logs of Coal Test Borings Nos. 1, 3-10, 26-29, 44-46, and 47-51 on Map II, Chapter X. It has been mined quite extensively on a commercial scale in McDowell County along Tug Fork between Roderfield and Deegans; on Spice Creek and Clear Fork; and on Dry Fork, just below the mouth of Bartlett Creek. Its thickness, character and composition at these commercial mines, country banks and prospect openings, and its approximate minable area, as outlined on Figure 23, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE WELCH SANDSTONE.

The 60 to 75 feet of interval separating the seam last described and the Welch Coal at Welch, McDowell County, is mostly occupied by a massive to current-bedded, medium grained to coarse, grayish white to light gray, lenticular and arenaceous stratum that has not been previously named. It is herein designated the **Welch Sandstone** from the latter point. Its thickness and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Pineville—Sugar Run, Little Whiteoak Creek, Whiteoak Branch, Panther, Bradshaw, Hite Fork, Cub Branch—Pando, Welch, and Dry Fork Station; in the special sections of the New River Group for Wilmore, Atwell, and Marytown; and in the logs of Coal Test Borings Nos. 5,

7, 8, 9, 10, 27, 48, 50 and 69. From the foregoing data it will readily be observed that it attains its best development in McDowell County, where it forms great cliffs along the valley walls of Tug Fork between Wilmore and Welch; and Dry Fork, between Avondale and Berwind. As it belongs immediately below the Sewell Coal, its outcrop follows closely the same region outlined for that of the latter bed on Map II. No quarries were observed on it, but its numerous cliff exposures along the streams last mentioned should furnish an almost inexhaustible supply of stone of practically the same character as given for the Lower Nuttall ledge on a preceding page of this Chapter.

THE WELCH COAL.

The Welch Coal of White¹¹, belonging at its type locality—Welch, McDowell County—60 to 70 feet below the Sewell bed and 0 to 10 feet above the great Upper Raleigh Sandstone, is a very important and persistent seam, especially in McDowell. M. R. Campbell¹² correlated this bed at Welch with the “Dismal Creek Coal” of Buchanan County, Virginia. It appears to be a separate and distinct bed and not a “split” off the Sewell proper of Fayette County, as suggested on page 244 of Volume II(A) of the State Survey Reports. The following section is typical of its development along Tug Fork:

			Ft.	In.
Coal, soft, columnar, 12" to.....	1'	3"		
Cannelly bone, 2" to.....	0	6		
Coal, soft, columnar, 18" to.....	2	9	4	6

As with the Sewell (“Davy”) Coal, the lower bench is generally thicker than the upper, and the cannelly bone parting is a very characteristic feature.

The thickness and stratigraphic position of the Welch Coal are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Left Fork of Allen Creek, Little Whiteoak Creek, Whiteoak Branch, Harman Branch, Bradshaw, Cub Branch—Pando, Welch, Coalwood, Jacob

¹¹I. C. White, Vol. II, W. Va. Geol. Survey, pp. 666-7; 1903.

¹²Tazewell Folio No. 44, U. S. G. Survey, p. 5, col. 3; 1898.

Fork and Head of Vall Creek; and in the special sections of the New River Group, on preceding pages of this Chapter for Wilmore, Atwell, and Marytown; and in the logs of Coal Test Borings Nos. 5, 7, 8, 9, 27, 40, 50, 69 and 93 on Map II, in Chapter X. There are no commercial mines on it in Wyoming, but in McDowell County it has been operated quite extensively along Tug Fork between Pando and Welch, where it is known locally as the "**Lambert**" or "**Hemphill**" seam. It is also mined commercially on Spice Creek, above the mouth of Honeycamp Branch; on Clear Fork, above the mouth of Jim Branch; and along Dry Fork, between Avondale and Bradshaw. As it belongs only 60 to 75 feet below the Sewell ("Davy") Coal, its outcrop follows closely the same region as that outlined for the latter bed on Map II.

Its thickness, character and composition at the commercial mines, country banks and prospect openings, and its approximate minable area, as outlined on Figure 24, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE UPPER RALEIGH SANDSTONE.

The Upper Raleigh Sandstone of White¹³, occupying the major portion of the interval—90 to 110 feet—separating the bed last described from the Little Raleigh Coal below, is very persistent and proved a very important key-rock in conjunction with the adjacent coals in tracing the measures southwestward from New River across Raleigh, Wyoming and McDowell Counties to the West Virginia-Virginia State Line. In the area under discussion it is generally heavy to current-bedded, medium grained to coarse, often conglomeratic, grayish white to brown in color, and forms steep slopes and great cliffs, these sometimes attaining a height of 100 feet. Its thickness and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Maben—Southwest, Herndon, Welch, Coalwood, Dry Fork Station, and Jacob Fork; in the special sections of the New River Group on preceding pages of this Chapter for

¹³I. C. White, Vol. II(A), W. Va. Geol. Survey, p. 198; 1908.

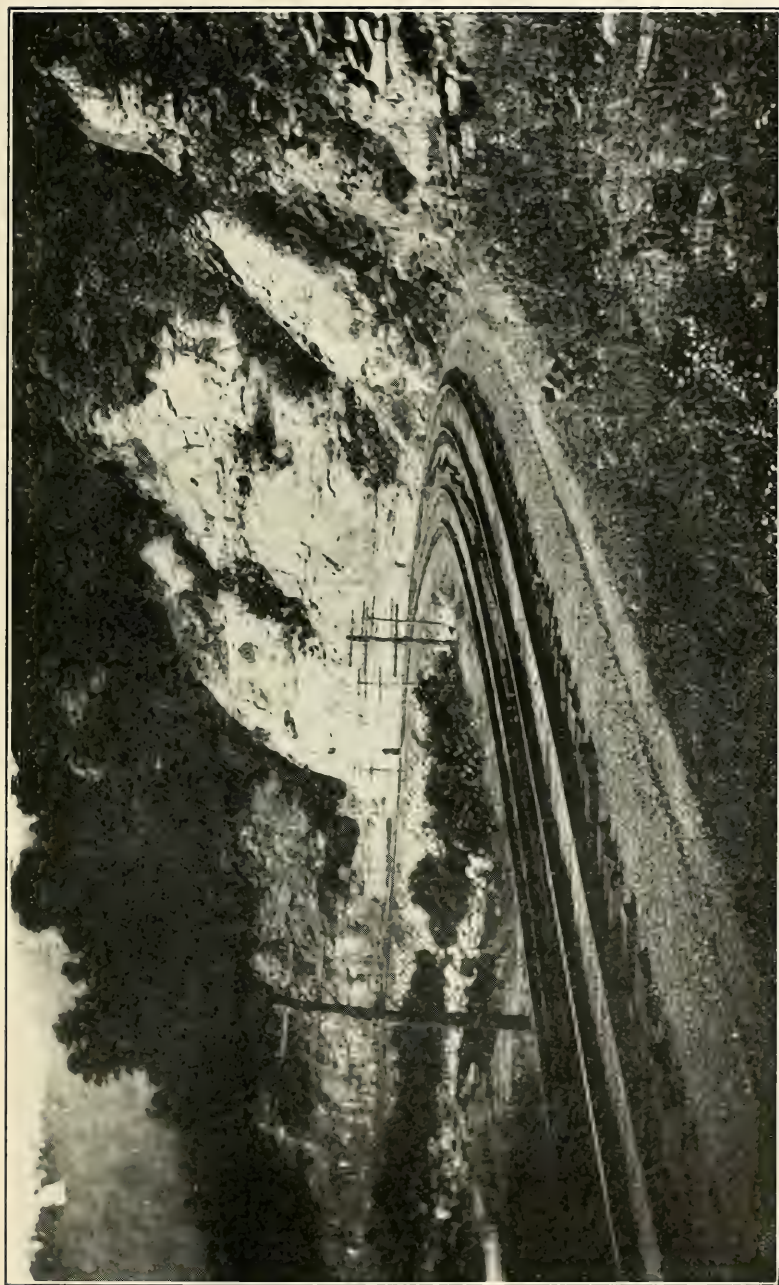


PLATE XI—Showing cliffs of the Nuttall ("Dotson") Sandstone extending 60 feet above the N. & W. R. R. grade,
3/4 mile northwest of Wyoming (formerly Dotson), McDowell County.

Fanny, Pineville—Williamson Branch, Wilmore, and Marytown; and in the logs of Coal Test Borings Nos. 1, 5, 8, 9, 10, 27, 67, 69, 81, and 88 on Map II, in Chapter X. Its position may be readily determined at any point, since it belongs only 60 to 80 feet below the Sewell Coal, the elevation of which is shown on Map II by the green structure contours. This stratum helped to preserve from erosion the crest of Flattop Mountain in the extreme eastern point of Wyoming, as also in the extreme eastern point of McDowell County. No quarries were observed on this ledge, but it is very similar in physical appearance to the Lower Nuttall Sandstone and it should be adapted to the same general uses as described for that stratum on a preceding page of this Chapter.

THE LITTLE RALEIGH COAL.

The Little Raleigh Coal of White¹⁴, belonging at its type locality—Raleigh, Raleigh County—in the interval separating the Upper and Lower Raleigh Sandstones and about midway in the Raleigh Sandstone of Campbell¹⁵, is very persistent, attaining minable dimensions at a point or two in McDowell County, where it is known locally as the **“Snake Root”** bed. It is generally multiple-bedded, soft and columnar, seldom exceeding 18 inches in thickness, and it has never been mined commercially in the State. Its thickness, character and relative position in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben—Southwest, Pineville—Sugar Run, Harman Branch, Coalwood, and Dry Fork Station; in the special section of the New River Group on preceding pages of this Chapter for Fanny; and in the logs of Coal Test Borings Nos. 1, 3, 7, 9, 10, 40, 65, 67, 69, 72, 81, 82 and 93 on Map II, in Chapter X. Since it belongs only 150 to 175 feet below the Sewell bed, the position of its outcrop may be readily determined in the region of its occurrence. In Wyoming County, although persistent, it is too thin and irregular to be of much economic importance, but on Clear and Dry Forks of Tug in McDowell, it is thicker

¹⁴I. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 198-9; 1908.

¹⁵M. R. Campbell, Raleigh Folio No. 77, U. S. G. Survey; 1902.

and more regular. The following section was measured by Gawthrop at a prospect opening in this bed along the south bank of Clear Fork, $\frac{1}{2}$ mile southeast of the mouth of Day-camp Branch:

	Ft.	In.
Sandstone, flaggy.....	10	0
Coal, soft, columnar, Little Raleigh	1	10
Shale and concealed to bed of Clear Fork.....	3	0

Here it comes at an elevation of 1425' B., 160 feet below the Sewell ("Davy") Coal.

Six miles southeastward on a branch of Big Creek, 0.2 mile northwest of Coal Test Boring No. 123 on Map II, Gawthrop measured the following section at a crop exposure of this bed near prospect openings in the Welch and Beckley Coals:

	Ft.	In.
Shale		
Coal, soft, medium.....1' 0" }		
Coal, hard, gray and bony..0 4 }	Welch.....	2 0
Coal, medium soft.....0 8 }		
Shale and concealed.....	87	6
Shale, bluish gray.....	5	0
Coal, soft, Little Raleigh (1810' B.).....	2	6
Shale and concealed.....	65	0
Shale, gray, silicious.....	15	0
Coal, Beckley , " War Creek ", with parting.....	5	3
Shale and concealed to Boring No. 123 on Map II..	100	0

The Little Raleigh Coal is exposed at crop close down along the Norfolk & Western Railway grade between the mouth of Little Slate Creek—tributary to Dry Fork—and English. In this region the following section was measured with hand-level down the north hillside of the latter stream, 0.2 mile southwest of Atwell:

	Thickness Feet.	Total Feet.
Sandstone, flaggy, great cliff, Lower Guyan- dot	60	60
Coal, Sewell (" Davy "), soft, with bony part- ing near top, 24".....	3	63
Sandstone, massive, great cliff, Welch	67	130
Shale, dark.....	6.5	136.5
Coal .....0' 4" }		
Canal bone.....0 5 }	Welch.....	1.2 137.7
Coal .....0 4 }		

	Thickness Feet.	Total Feet.
Sandstone, Upper Raleigh , dark, shaly, laminated	38.8	176.5
Coal, gas, soft, columnar, Little Raleigh , (1245' B.).....	1.5	178
Shale		

The Welch Coal was traced to this point by direct crop exposures along the N. & W. Ry. grade from the commercial mines on it near Avondale (Ritter), Rex and mouth of Hurricane Branch, and just below Bradshaw, it may be observed to thin down from a minable bed to less than the dimensions given in the above section; hence, there is no question as to the correlation of the Little Raleigh seam. Then, too, the Beckley or "War Creek" bed belongs just 125 feet lower in the measures as exhibited by the log of Coal Test Boring No. 93 on Map II, located 1.5 miles southward and listed above.

The writer collected a sample for analysis and obtained the following data at a crop exposure of the Little Raleigh Coal along the same railway grade in this region, 0.3 mile southward from the mouth of Johnnycake Hollow:

Crop Exposure—No. 67 on Map II.

	Ft.	In.
Sandstone, dark, laminated.....	20	0
Coal, soft, columnar, Little Raleigh (1285' B.)....	1	10
Sandstone, dark, laminated, to railway grade.....	20	0

The composition of the coal, as reported under sample No. 884H, is found under **No. 67** in the Table of Analyses at the end of Chapter X. The sample was slightly weathered, and for that reason the results probably show a higher ash content than would occur under normal mining conditions.

In forming an estimate of the available coal for the territory of this Report, the Little Raleigh Coal was not considered, but the northwest portion of Big Creek District (McDowell) should some time furnish quite a large amount of high grade fuel from this bed when the thicker and more accessible seams begin to approach exhaustion.

THE LOWER RALEIGH SANDSTONE.

The Lower Raleigh Sandstone of White¹⁶, occupying the 75 to 125 feet of interval separating the coal last described from the Beckley or "War Creek" bed below, attains its normal development of Raleigh County. It is generally massive to current-bedded, medium grained to coarse, grayish white in color, and forms steep slopes and pronounced cliffs, often in conjunction with the Upper Raleigh ledge, wherever it outcrops. Its thickness, character and relative position in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Maben—Southwest, Pineville—Sugar Run, Little Whiteoak Creek, Herndon, Whiteoak Branch, Avondale, Bradshaw, Cub Branch—Pando, Welch, Keystone, Coalwood, Dry Fork Station, Jacob Fork, Berwind, Head of Vall Creek, and Bearwallow Knob—2 Miles East; in the special section of the New River Group, on preceding pages of this Chapter for Marytown; and in the logs of Coal Test Borings Nos. 3, 5, 9, 45A, 47, 69, 72, 79, 82 and 101 on Map II, in Chapter X. As this stratum belongs immediately above the Beckley or "War Creek" Coal, its outcrop follows very close the same regions as that outlined for the latter bed on Map II. In the extreme western edge of Browns Creek District (McDowell), it is this sandstone that forms the high cliff at Roderfield, extending 70 to 80 feet above the Norfolk & Western Ry. grade. The two railway tunnels immediately northeast and southwest of this point have been bored through this ledge. The following section was measured by the writer at its crop at the west portal of the third railway tunnel west of Roderfield, 0.6 mile east of the mouth of Clear Fork:

	Ft.	In.
Concealed		
Sandstone, Upper Raleigh	15	0
Coal, soft, Little Raleigh (1115' B.).....	1	2
Shale, dark.....	6	0
Sandstone, massive, platy, Lower Raleigh , to railway grade.....	40	0

At the eastern portal of the same tunnel, 65 feet of the upper portion of this stratum is exposed above the bed of Tug

¹⁶ C. White, Vol. II(A), W. Va. Geol. Survey, p. 198; 1908.

Fork, 5 feet below 12 to 15 inches of Little Raleigh Coal, as determined by the writer. At the west portal of the second tunnel west of Roderfield, the basal portion of this ledge was once quarried for use in the concrete lining of the tunnel. Here the following section was determined by the writer:

	Feet.
Coal blossom, Little Raleigh, (1177' B.).....	0
Sandstone, Lower Raleigh, to railway grade.....	75

No other quarries were observed on this ledge, but it is very silicious and should crush into sand adapted to the manufacture of concrete for use in various forms of highway construction wherever it crops down near drainage, its numerous cliff exposures furnishing an inexhaustible supply of stone.

THE BECKLEY ("WAR CREEK") COAL.

The Beckley Coal of Campbell¹⁷ and as later recognized by White¹⁸, belonging at its type locality—Beckley, Raleigh County—immediately at the base of the sandstone last described, is very persistent and attains minable dimensions in both counties. It is without doubt the same as the "War Creek" bed of Campbell¹⁹, as tentatively correlated by I. C. White on pages 195-8 of Volume II(A) cited above, the type location of the latter seam being War Creek, McDowell County. Its thickness, bed structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben—Southwest, Left Fork of Allen Creek, Pineville—Sugar Run, Herndon, Harman Branch, Avondale, Bradshaw, Cub Branch—Pando, Coalwood, Dry Fork Station, Jacob Fork, and Bearwallow Knob—2 Miles East; in the Pineville—Williamson Branch Section, page 174; and in the logs of Coal Test Borings Nos. 1, 3-11, 17A, 45A, 52, 65-67, 69, 70, 72, 73, 79-86, 88, 90, 91, and 93 on Map II, on subsequent pages in Chapter X. Its varying intervals below the

¹⁷M. R. Campbell, Raleigh Folio, No. 77, U. S. G. Survey, p. 7; 1902.

¹⁸I. C. White, W. Va. Geol. Survey, Vol. II, p. 667-8; 1903; and Vol. II(A), pp. 186-195; 1908.

¹⁹M. R. Campbell, Tazewell Folio No. 44, U. S. G. Survey, p. 5; 1898.

Sewell ("Davy") Coal and the No. 3 Pocahontas bed are shown for several widely scattered points in the two tables at the beginning of Chapter III, pages 35 and 36, respectively, from which it will be observed that there is a remarkable uniformity in those of the first coal, with only a slight increase to the southeast and southwest, while those for the latter bed exhibit a marked increase in the same directions.

The detailed crop of the Beckley or "War Creek" Coal is outlined on Map II. It has never been mined on a commercial scale in Wyoming County, but it has been opened at many points in Center, Slab Fork and Barkers Ridge Districts by natives for domestic fuel, giving highly satisfactory results. In the northwestern portion of Big Creek District (McDowell) it is operated on a commercial scale on Spice Creek, near Erin; on Dry Fork, between English and Berwind; on Barrenshe Creek, at Caretta; and on War Creek, near Warrior. Its thickness, character and composition at the commercial mines, country banks and prospect openings, and its approximate minable area, as outlined on Figure 25, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE QUINNIMONT SANDSTONE.

The Quinnimont Sandstone of White²⁰, belonging at its type locality—Quinnimont, Fayette County—immediately below the coal last described, is very irregular in both Wyoming and McDowell, often cutting out the underlying Quinnimont Shale and resting directly upon the Fire Creek Coal, and again thinning away to be entirely replaced by the same shale. It is generally current to heavy-bedded, medium grained, light gray to buff in color, and lenticular, ranges in thickness from 0 to 100 feet, and has been quarried in each county for use in construction of foundations and concrete linings of railway tunnels. Its thickness, character and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Mahan, Mahan—Southwest. Pineville—Sugar Run, Herndon, Clarks Gap, Bradshaw, Cub Branch—

²⁰I. C. White, Vol. II(A), W. Va. Geol. Survey, p. 13; 1908.

Pando, Keystone, Coalwood, Jacob Fork, and Bearwallow Knob—2 Miles East; and in the logs of Coal Test Borings Nos. 1, 3, 6, 7, 9, 17A, 45A, 47, 52, 56, 67, 69, 70-73, 76, 78, 80-82, 84-86, 88, 96, and 98 on Map II, on subsequent pages in Chapter X.

In the east edge of Slab Fork District (McDowell), 0.3 mile eastward from the mouth of Old Slab Fork, this stratum has been quarried along the north edge of the Virginian Railway, where the following section was measured by the writer:

	Ft.	In.
Concealed		
Shale, sandy, buff.....	5	0
Coal, Beckley, (1750' B.).....	0	2
Fire clay shale, dark.....	1	6
Sandstone, Quinnimont, massive, gray, micaceous, quarry ledge.....	10	0
Concealed, mostly sandstone to railway grade...	40	0

Stone from this quarry was probably used in the construction of the piers of the railway bridge across Slab Fork, 0.2 mile eastward.

In Browns Creek District (McDowell), it was once quarried just above the east portal of the N. & W. Railway tunnel at Deegans. Here the quarry face is 90 to 100 feet long, 25 to 30 feet high, and extends back into the hill 25 to 30 feet, the ledge being somewhat current-bedded, medium grained, micaceous, buff in color, and working into blocks of irregular and assorted sizes. The base of the quarry has an elevation of 1320' B., coming 50 feet above an exposure of the Fire Creek Coal and over 300 feet below the Sewell bed, as determined by the writer.

Eastward to the vicinity of Welch, this sandstone has been quarried on the south hillside of Elkhorn Creek, due south of the eastern portal of the N. & W. Railway tunnel, at an elevation of 1520' B. Here only 20 feet of the top portion is faced up, the ledge being heavy-bedded, medium grained and grayish brown in color. Rock from this quarry was used in the construction of the handsome stone residence of Mr. W. J. McClaren in Welch. Stone from another quarry on this stratum a few hundred feet southwestward along the same hillside was used in the construction of the residence of Judge

Herndon in the same town. Neither of the quarries is now in operation.

The writer measured the following section at another quarry on the Quinnimont Sandstone in the northwest central portion of Big Creek District (McDowell), on the west bank of Dry Fork, $\frac{1}{4}$ mile southward from Yukon:

	Feet.
1. Coal, Beckley or "War Creek", with partings, 5' to....	8
2. Sandstone .....10'	} Quinnimont Sandstone.... 35 (1315' B.)
3. Concealed 9	
4. Sandstone, broken and irregularly bedded, quarried .....10	
5. Sandstone, massive, quarry ledge..... 6	

The quarry face is about 60 feet long and 15 feet high, only Nos. 4 and 5 of section being worked. The stone is bluish gray, medium grained, micaceous and splits irregularly, except the basal ledge, and is used in the construction of a retaining wall to support a track to the Yukon Coal Company's Mine No. 1 (No. 74 on Map II).

THE QUINNIMONT SHALE.

The Quinnimont Shale of Campbell²¹, occupying the interval between the Beckley and Fire Creek (Quinnimont) Coals at its type locality—Quinnimont, Fayette County—maintains its reputation for variability in the territory of this Report. Here, it is dark gray, laminated, with both argillaceous and arenaceous layers, the whole ranging in thickness from a few inches to 75 feet or more. As mentioned above, it is frequently cut away entirely by the sandstone of the same name. The extreme variation in thickness of these two members has led to considerable confusion in the correlation of the Beckley and Fire Creek Coals at their several crop exposures along the Virginian Railway in Raleigh and Wyoming Counties as described below under the account of the latter bed. The thickness of this shale and its stratigraphic position are exhibited in the general sections of the Pottsville Measures

²¹M. R. Campbell, Raleigh Folio No. 77, U. S. G. Survey; 1901.

given on preceding pages in Chapter IV for Maben, Pineville-Sugar Run, and Clarks Gap; and in the logs of Coal Test Borings Nos. 3, 8, 10, 13, 72, 73 and 76 on Map II, on subsequent pages in Chapter X. At some points in southeastern Wyoming it may run high enough in argillaceous matter to burn into a fair building brick, but, as a general rule, it probably carries too high a silica content to give satisfactory results if burned for paving brick.

THE FIRE CREEK (QUINNIMONT) COAL.

The Fire Creek Coal of White²², belonging at its type locality—Fire Creek, Fayette County—immediately below the shale last described, 75 to 125 feet below the Beckley bed and 300 to 350 feet below the Sewell seam, is very persistent and attains minable dimensions, although it has never been operated on a commercial scale. This coal has frequently been correlated with the Beckley along the Virginian Railway in Slab Fork and Barkers Ridge Districts (Wyoming). In the writer's judgment, the "Lower Beckley" Coal of the section published on page 189 of Volume II(A) last cited, belongs at this horizon instead of being a separate and distinct bed, the typical Quinnimont Shale having thinned down locally to 30 feet, and the bed designated "Fire Creek", 160 feet lower in the measures, should represent the No. 9 Pocahontas Coal. Southwestward from this point—Slab Fork, Raleigh County—along the grade of the Virginian Railway to Maben in Wyoming, the extreme variation in the thickness of the Quinnimont Shales separating the Fire Creek from the overlying Beckley Coal is strikingly exhibited in direct crop exposures, where it ranges from less than 12 inches of black slate with coal streaks to 60 feet of dark, laminated, flaggy and sandy shale. The coal designated the "Lower Beckley" in the section last mentioned is undoubtedly the same bed as that at a depth of 489 feet in Coal Test Boring No. 11 on Map II, the log of which is used in connection with the Section 2.1 Miles Southwest of Maben, page 70. A careful study of the logs

²²I. C. White, Bull. 65, U. S. G. Survey, p. 197; 1891; and Vol. II(A), W. Va. Geol. Survey, pp. 179-185; 1908.

of Coal Test Borings Nos. 1-14 inclusive on Map II further corroborates this conclusion.

The thickness, bed-structure and relative position of the Fire Creek Coal in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Maben—Southwest, Left Fork of Allen Creek, Little Whiteoak Creek, Mullens, Herndon, Clarks Gap, Avondale, Bradshaw, Welch, Coalwood, Jacob Fork, Bearwallow Knob—2 Miles East, and Crumpler; and in the logs of Coal Test Borings Nos. 1, 3-10, 13, 17A, 40, 52, 65-7, 69-74, 76-9, 81-6, 88, 91, 96, 98, 101, 106, 107, 137 and 164, on subsequent pages in Chapter X. It has been prospected and opened by the natives of southeastern Wyoming County for domestic fuel. Its thickness, character and composition at these country banks and crop exposures, and its approximate minable area, as outlined on Figure 26 are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE LITTLE FIRE CREEK COAL.

The Little Fire Creek Coal of White²³, belonging at its type locality—Grandview, Raleigh County—20 to 40 feet below the bed last described and having a thickness of only 6 inches, is very persistent but irregular in its dimensions. It is generally multiple-bedded, soft, columnar, and seldom exceeds 18 inches from top to bottom. Its thickness and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben—Southwest, Bailey Chapel, Clarks Gap, Avondale, Bradshaw, Coalwood, Jacob Fork, Bearwallow Knob—2 Miles East, and Crumpler; and in the logs of Coal Test Borings Nos. 7, 10, 13, 17A, 20, 52, 60, 65-6, 69, 70, 74, 76, 78-9, 81-2, 84-6, 90, 96, 98, 101, 106, 113, 123, 163 and 164 on Map II, on subsequent pages in Chapter X. From the foregoing data it will be observed that the interval separating it from the overlying Fire Creek Coal is quite variable in its composition, ranging from sandy and argillaceous shale to flaggy or massive sandstone.

The Little Fire Creek Coal has never been mined commer-

²³I. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 22 and 25; 1908.

cially and it is seldom prospected by the natives as a source of domestic fuel, and, owing to its thinness and irregularity, it can hardly be considered a minable bed.

THE PINEVILLE SANDSTONE.

At 50 to 75 feet below the Beckley Coal, directly above the horizon of the No. 9 Pocahontas seam and 30 to 40 feet above the bed of Guyandot River at Pineville, Wyoming County, there outcrops a massive to current-bedded, medium grained, buff to bluish gray and arenaceous stratum, forming sheer cliffs almost 100 feet in height, that has not been previously described. It is herein designated from the latter point the **Pineville Sandstone**. Here, it forms the upper two-thirds of the locally famous "Castle Rock", a toadstool-shaped figure—in situ—on the north bank of the river, just below the mouth of Rockcastle Creek, the summit of which extends 125 to 130 feet above drainage. A cut of this rock appears on another page of this Report.

The thickness, character and stratigraphic position of the Pineville Sandstone are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Bailey Chapel, Clarks Gap, Cub Branch—Pando, Coalwood, and Bear-wallow; and in the logs of Coal Test Borings Nos. 7, 10, 13, 17A, 20, 45A, 47, 54, 56, 60, 65, 69-73, 76-85, 88, 104 and 136 on Map II, on subsequent pages in Chapter X.

This sandstone is a prominent cliff-maker along both banks of Guyandot River for 5 to 6 miles below Pineville, and for several miles southeastward from the latter point along the valley walls of both the River and Pinnacle Creek. No quarries were observed on it in Wyoming, but in Browns Creek District (McDowell), it has been quarried considerably for building stone on Elkhorn Creek and Tug Fork. It is this stratum that was once quarried on the north hillside of the former stream at Olmsted, at an elevation of 1420' B., about 370 feet above the base of the No. 3 Pocahontas Coal. Here the quarry face is about 100 feet long, 30 feet high, and is worked back into the hill 20 to 30 feet, the ledge being massive, medium grained and bluish gray in color. Stone from this

quarry was used in the construction of the bee-hive coke ovens at this place.

Two miles westward this sandstone has been quarried along the south hillside of Elkhorn, immediately southeast of the eastern portal of the railway tunnel at Welch, on the land of William Leckie, at an elevation of 1375' B., about 375 feet above the No. 3 Pocahontas Coal, where the following aneroid section was determined by the writer:

	Feet.
Sandstone, massive, platy, medium grained, gray and brown, Quinnimont	70
Concealed	20
Shale, black.....	20
Sandstone, massive, buff, medium grained.....	27
Coal, Little Fire Creek, 10" to	1
Slate, black, 10" to.....	1
Sandstone, Pineville, quarry ledge, massive, medium grained, bluish gray, (1375' B.)	21

Stone from this quarry was used by Mr. Leckie in the construction of his handsome combination garage and stable in the immediate vicinity.

The Pineville Sandstone has also been quarried along the north hillside of Tug Fork, one-eighth mile northwest of the western portal of the tunnel last mentioned. None of the foregoing quarries on this ledge is now in operation. Since this sandstone belongs directly above the No. 9 Pocahontas Coal, the position of its outcrop may be readily approximated in the region of its occurrence by reference to the tables of intervals of the several coals above and below the Sewell and No. 3 Pocahontas beds, pages 35 and 36, respectively.

THE NO. 9 POCAHONTAS COAL.

The No. 9 Pocahontas Coal of White²⁴, belonging at its type locality—Crane Creek, Mercer County—400 feet above the No. 3 Pocahontas bed and 110 feet above the true No. 7 Pocahontas seam, is very persistent, but somewhat slaty and quite irregular in its dimensions. In this Report it has been placed immediately at the base of the sandstone last described.

²⁴J. C. White, Vol. II(A), W. Va. Geol. Survey; pp. 102 and 177; 1908.

Its thickness, bed-structure and relative position in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Maben—Southwest, Left Fork of Allen Creek, Pineville—Sugar Run, Bailey Chapel, Clarks Gap, Avondale, Bradshaw, Coalwood, Jacob Fork, and Bearwallow Knob—2 Miles East; and in the logs of Coal Test Borings Nos. 1, 3, 7, 9, 10, 17A, 20-1, 47, 54, 58, 60, 66, 69, 74, 76-7, 79-83, 85-6, 88, 90-1, 96, 98, 105, 123, 136-7, 163-4, and 168 on Map II, on subsequent pages in Chapter X. On page 102 of the citation last noted, its correlation is doubtfully suggested with that of the Fire Creek bed by Dr. White, but, as mentioned on a preceding page under the description of the latter seam, and as thoroughly corroborated by the foregoing sections and bore hole records, the No. 9 Pocahontas Coal belongs 125 to 150 feet lower in the measures. It has never been mined commercially in the State, but in southeastern Wyoming, along Pinnacle Creek and Guyandot River, above Pineville, it has been prospected quite extensively. It is this bed that exhibits 11 feet of clean, soft and columnar coal, without a parting, at a prospect opening (No. 743 on Map II) on the north edge of the public road leading along Guyandot River, 2.5 miles eastward from Pineville and 0.6 mile eastward from the mouth of Sugar Run, at an elevation of 1380' B., about 300 feet above the No. 3 Pocahontas bed and about 400 feet below the Sewell seam. Its lenticular and irregular nature is strikingly exhibited here, as it is less than 12 inches in thickness at a prospect opening not over 250 feet westward, and less than 7 feet, at another, not over 150 feet eastward.

Its thickness, character and composition at country banks and prospect openings, and its approximate minable area, as outlined on Figure 6 along with that for the Stockton Coal, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE NO. 8 POCAHONTAS COAL.

The No. 8 Pocahontas Coal of White²⁵, belonging in the interval separating the bed last described from the No. 7

²⁵I. C. White, Vol. II(A), W. Va. Geol. Survey; pp. 102 and 177; 1908.

Pocahontas seam below and being the basal member of the New River Group as classified in this Report, is a thin and impure coal, seldom exceeding 30 inches in thickness, including its parting slates. Its bed-structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Left Fork of Allen Creek, Clarks Gap, Bradshaw, Welch, Coalwood, Bearwallow—2 Miles East, and Elkhorn; and in the logs of Coal Test Borings Nos. 8, 10, 17A, 21, 47, 60, 65-6, 80, 83, 86, 88, 90-1, 98, 110-11, 122-4, 129, 137, and 166 on Map II, on subsequent pages in Chapter X. It is self evident from the foregoing data that this bed is too thin, impure and irregular in its distribution to be classed as a minable bed. Its outcrop follows the division line between the New River and Pocahontas Groups as detailed on Map II.

CHAPTER VII.

STRATIGRAPHY—THE POCAHONTAS GROUP.

GENERAL ACCOUNT.

The Pocahontas Group, or Lower Pottsville Measures, beginning at top with the Flattop Mountain Sandstone and extending down to the top of the Mauch Chunk Red Shales of the Mississippian, attains a thickness of 700 to 750 feet in southeastern McDowell County, as against about 350 feet on New River, near Prince, Fayette County. This represents an increase equal to its total thickness at the latter locality in an air line distance of 50 miles to the southwestward. The series, as limited in this Report, was first named by I. C. White¹ from the town of Pocahontas, Tazewell County, Virginia, where its contained coal beds were first opened for commercial shipments. Its strata consist of massive to current-bedded sandstones, medium grained to coarse, slightly argillaceous and comparatively free of pebbles, light gray to greenish gray in color; coal beds, generally multiple-bedded, soft and columnar in type; impure fire clays; shales, both arenaceous and argillaceous, buff, gray and black in color; and three marine fossiliferous horizons; viz, Roof shale of No. 6 Pocahontas Coal, Roof shale of No. 3 Pocahontas Coal, and North Fork Shale. The detailed crop of the Pocahontas Group, as outlined on Map II, is confined to the southeastern portions of each county. As with the Kanawha and New River Groups, sandstones predominate, constituting 50 to 55 per cent. of the strata, but the coal seams have by far the greatest present economic value, the formation holding five minable beds, the descriptions of which are given on subsequent pages of this Chapter and in Chapter X.

¹Vol. II(A), W. Va. Geol. Survey, pp. 13-14; 1908.

The Pocahontas Group affects the topography somewhat different from the New River Group, in that, long, persistent and bold cliff exposures around the hillsides do not so generally prevail, although occurring in a less degree, the slopes being generally more uniform. The thickness and stratigraphic succession of the several members of this formation are exhibited in detail in the General Section of the Pottsville Measures, pages 51-60, along with that for the Kanawha and New River Groups.

DESCRIPTION OF MEMBERS.

The several members of the Pocahontas Group will now be described in descending order, the succession of which is exhibited in the General Section of the Pottsville Measures, pages 51-60.

THE FLATTOP MOUNTAIN SANDSTONE.

The Flattop Mountain Sandstone of White², belonging at its type locality—near summit of Flattop Mountain, 2 miles northwest of Pocahontas, Virginia—300 feet above the No. 3 Pocahontas Coal, and being the topmost member of the Pocahontas Group, is very persistent, especially in McDowell County, where it is generally massive to current-bedded, medium grained to coarse, micaceous, bluish gray to brown in color, ranging in thickness from 20 to 50 feet. Its dimensions, character and relative position in the rock column are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben—S. W., Pineville—Sugar Run, Whiteoak Branch, Bailey Chapel, Avondale, Bradshaw, Cub Branch—Pando, Coalwood, Long Branch, Jacob Fork, Horsepen Creek and Elkhorn; and in Chapter X in the logs of Coal Test Borings Nos. 1, 8, 10, 13, 17A, 20, 21, 47, 52, 56, 60, 65, 66, 69-74, 76-83, 85-6, 88, 91, 96, 98-9, 104, 123, 136, 137, 163-4, 166 and 168 on Map II. As it belongs immediately below the No. 8 Pocahontas Coal, its outcrop should follow closely the division line between the New River and Pocahontas Groups

²I. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 13-14; 1908.

as outlined on Map II. No quarries were observed on it in Wyoming, but in McDowell County, this ledge has been used for foundations and buildings near Kimball, Olmsted, Welch, Rift and Berwind, the descriptions of which are given on subsequent pages under "Building Stone" in Chapter XI.

THE RIFT SHALE.

Immediately at the base of the sandstone last described and directly above the No. 7 Pocahontas Coal, there crops in the bed of Big Creek at Rift, McDowell County, 1 mile due north of Berwind, a dark gray, laminated and argillaceous stratum, with silicious layers, carrying thin lenses of iron ore and ranging in thickness from 15 to 30 feet, that has not been previously described. It is herein named the **Rift Shale** from the latter point. Its stratigraphic position and persistence over quite a wide area in the southeast portion of each County are exhibited in the Cub Branch—Pando Section, page 103; and in the logs of Coal Test Borings Nos. 10, 17A, 20, 60, 79, 86, 88, 99, 166 and 168 on Map II given on subsequent pages in Chapter X. It is very similar in physical appearance to the Upper Iaeger, Lower Iaeger and Sandy Huff Shales, described on preceding pages in Chapter VI, and for that reason it should burn into brick adapted for building purposes. Like the Sandy Huff Shale, it probably runs too high in silica to make satisfactory brick for road surfacing. Its outcrop low down along the valley walls of Dry Fork between Rift and Berwind and its development in good thickness—25 to 30 feet—are in its favor should any operations on it be anticipated in this region.

THE NO. 7 POCAHONTAS COAL.

The No. 7 Pocahontas Coal of White³, belonging at its type locality—Pocahontas, Virginia—immediately below the last formation described, 80 to 100 feet above the No. 6 Pocahontas bed and 275 to 290 feet above the No. 3 Pocahontas seam, is very persistent and attains minable dimensions in Slab Fork and Barkers Ridge Districts, Wyoming, and North

³I. C. White, Vol. II(A), W. Va. Geol. Survey, pp. 102-4; 1908.

Fork and Elkhorn Districts, McDowell County, where it has been prospected considerably. It is generally multiple-bedded, soft and columnar, ranging in thickness from 6 inches to 3 feet. Its dimensions, bed-structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Maben—2 Miles Southwest, Left Fork of Allen Creek, Mullens, Herndon, Bailey Chapel, Clarks Gap, Bradshaw, Cub Branch—Pando, Welch, Berwind, Bearwallow Knob—2 Miles East, Crumpler and Elkhorn; and in Chapter X in the logs of Coal Test Borings Nos. 3, 7, 10, 13, 17A, 20, 54, 58-60, 63, 65-6, 72-4, 77, 80, 85-6, 88, 90-1, 98-9, 101, 104, 107, 108, 110-11, 113, 121, 122, 124, 137, 163-4, 166 and 168 on Map II. It has never been mined commercially in the State, but its character and composition at country banks, prospect openings and crop exposures, and approximate minable area, as outlined on Figure 7, along with that for the Coalburg Coal, are described on subsequent pages in the latter Chapter, along with an estimate of its available tonnage.

THE PIERPONT SANDSTONE.

In the eastern portion of Slab Fork District (Wyoming), a heavy to current-bedded, medium grained, micaceous, bluish to light gray, arenaceous stratum, belonging immediately below the coal last described, forms cliffs flush with the Virginian Railway grade for a short distance southeastward from Pierpont. As this ledge has not been previously described, it is herein named the **Pierpont Sandstone** from the latter place where it ranges from 50 to 60 feet in thickness. Its dimensions, character and relative position in the rock column are exhibited in the general sections of the Pottsville Measures in Chapter IV for Maben—Southwest, Pineville—Sugar Run, Little Whiteoak Creek, Whiteoak Branch, Avondale, Bradshaw, Welch, Keystone, Coalwood, Jacob Fork, Mouth of Long Branch, Head of Vall Creek, Bearwallow Knob—2 Miles East, Horsepen, Crumpler and Elkhorn; and in Chapter X in the detailed logs of Coal Test Borings Nos. 3, 7, 10, 13, 17A, 20, 21, 45A, 47, 52, 56, 60, 62, 63, 66, 69, 71-4, 76-83, 85-6, 90, 96, 99, 104, 112, 123, 124, 130, 137, 166, and 168 on Map II. It is

this sandstone that forms the great cliff along the Virginian Railway grade slightly over one-half mile southeast of Bud in Slab Fork District (Wyoming), where it cuts out entirely the underlying No. 6 Pocahontas Coal. It also forms prominent escarpments close down along Barkers Creek between the mouth of Milam Fork and Basin, according to Gawthrop.

In McDowell County, Browns Creek District, the writer measured the following section with aneroid at the exposure of this ledge at the south portal of the N. & W. Railway tunnel, just south of Dixopoca:

			Ft.	In.
Sandstone, platy, Pierpont.....			70	0
Shale, dark.....			40	0
Coal, soft.....0' 3"	} No. 6 Pocahontas (1435' B.)			
Slate, gray.....0 1			0	9
Coal, soft.....0 5				
Sandstone, massive.....			34	0
Coal .....0' 8 "	} No. 5 Pocahontas (1400' B.)			
Slate .....0 0½				
Coal .....1 0			2	10½
Shale, sandy.....1 0				
Coal .....0 2				
Sandstone, massive, bluish gray, Eckman, to rail- way grade.....			17	0

In Adkin District, same County, it appears to be this sandstone that has been quarried on the west edge of the public road, 1.3 miles north of Pageton, where the following data were obtained by Gawthrop:

	Feet.
Concealed	
Sandstone, massive, broken, medium grained, Pierpont..	15
Concealed	
Elevation of quarry, 2040' B.	

Here it belongs 150 feet above the No. 3 Pocahontas Coal. The stone quarried was used in the construction of a small dam in Belcher Branch to impound water for Mine No. 1 of the Page Coal & Coke Co.—No. 121 on Map II. The crop exposures of the Pierpont Sandstone should follow closely the same regions as that outlined on a preceding page for the Flat-top Mountain ledge.

THE NO. 6 POCAHONTAS COAL.

The No. 6 Pocahontas Coal of White⁴, belonging at its type locality—Pocahontas, Virginia—80 feet below the No. 7 Pocahontas bed and 189 feet above the No. 3 Pocahontas seam, is very persistent and attains minable dimensions in the south-east portion of each County. It is generally multiple-bedded, soft and columnar, ranging in thickness from a few inches to 5 feet and belonging near the base of the sandstone last described. In fact the excessive development of the latter is sometimes responsible for the disappearance of this coal as mentioned above under the discussion of the Pierpont ledge. The thickness, bed-structure and stratigraphic position of the No. 6 Pocahontas Coal are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Cabin Creek Ridge, Maben, Maben—Southwest, Left Fork of Allen Creek, Pineville—Sugar Run, Whiteoak Branch, Bailey Chapel, Clarks Gap, Avondale, Bradshaw, Jacob Fork, Berwind, Head of Vall Creek, Bearwallow Knob—2 Miles East, Mouth of Horsepen Creek, and Crumpler; and in the logs of the coal test borings in Chapter X. For ready reference to borings recording this bed, the reader is cited to the summarized table of logs for each County, given in the same Chapter. It has never been mined commercially in the territory of this Report, but its character and composition at country banks, prospect openings and crop exposures, and approximate minable area, as outlined on Figure 8, along with that for the Winifrede Coal, are described on subsequent pages in Chapter X, with an estimate of its available tonnage.

The roof shale of the No. 6 Pocahontas Coal carries marine fossils at an exposure along an incline to a coal mine in the Fire Creek bed down the south hillside of New River at Royal, Raleigh County, as first discovered by C. E. Krebs and the writer after the field work in Wyoming and McDowell Counties had been completed. Mr. Krebs reports marine fossils in the same shale in Mercer County, and it probably carries a similar fauna in the territory of this Report, but for reasons mentioned, no careful search for them was made.

⁴I. C. White, Vol II(A), W. Va. Geol. Survey, pp. 103-4; 1908.

THE ECKMAN SANDSTONE.

At Eckman, McDowell County, the major portion of the 75 to 90 feet of interval, separating the coal last described from the No. 4 Pocahontas bed, is occupied by a massive to current-bedded, medium grained, buff to bluish gray and arenaceous stratum, that has been quarried in the hill immediately south-east of the town. As it has not been previously described, it is herein named from the latter place the **Eckman Sandstone**. Its thickness, character and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben—Southwest, Left Fork of Allen Creek, Pineville—Sugar Run, Little Whiteoak Creek, Mullens, Herndon, Whiteoak Branch, Avondale, Bradshaw, Cub Branch—Pando, Welch, Keystone, Coalwood, Head of Vall Creek, Bearwallow Knob—2 Miles East, Crumpler and Elk-horn; and in the logs on subsequent pages in Chapter X for Coal Test Borings Nos. 7, 8, 10, 13, 16, 17A, 21, 47, 56, 60, 62-3, 69, 70, 72-3, 76-9, 81-3, 88, 91, 112, 128, 130, 136, 138, 153, 164, 166, 168-9, and 172 on Map II. At the quarry mentioned above for its type locality, the writer measured the following section:

	Feet.
Concealed	
Shale	5
Sandstone, Eckman, massive to current-bedded, medium grained, buff to bluish gray, with 6" to 12" streak of iron ore nodules near middle, quarry ledge (1855' B.) ..	60
Concealed in bench	5
Sandstone, Upper Pocahontas, flaggy, partly concealed....	50
Concealed	5
Coal, No. 3 Pocahontas, (1785' B.)	5

Stone from this quarry was used in the construction of the coke ovens for the Pulaski Iron Co. in the immediate vicinity.

The crop of this sandstone is exposed at the east portal of the N. & W. Railway tunnel, just west of Kimball, where the following section was measured by the writer:

	Ft.	In.
Sandstone, bluish gray, medium grained, Pierpont	50	0
Coal, slaty.....0' 5" }	2	4
Coal, soft.....0 11 }		
Bone .....0 2 }		
Coal, soft.....0 10 }		
Sandstone, Eckman, bluish gray, medium grained, (1465' B.).....	55	0
Concealed to bed of Elkhorn Creek, and horizon of No. 4 Pocahontas Coal.....	5	0

In Elkhorn District (McDowell), it is this ledge that is quarried on the south hillside of Elkhorn Creek at Elkhorn, where the following section was measured by the writer:

	Feet.
Concealed	
Sandstone, massive, bluish gray...30' }	Eckman (2135' B.) 85
Sandstone, with iron ore nodules.. 3 }	
Sandstone, massive, buff, to base of quarry.....12 }	
Sandstone, buff, medium grained..40 }	
Interval	90
Coal, No. 3 Pocahontas.....	

Only the upper 45 feet is worked, the quarry face being about 100 feet long and worked back about 40 feet into the hill. The stone is used in the construction of foundations and retaining walls in Elkhorn.

In Adkin District, same County, Gawthrop reports a quarry in this ledge on the north hillside of Tug Fork, $\frac{1}{4}$ mile northwest of Pageton, where he measured the following section:

	Ft.	In.
Concealed		
Sandstone, massive, medium grained, mica-ceous, quarry rock, Eckman.....	40	0
Concealed and shale.....	74	0
Coal, No. 3 Pocahontas, at Mine No. 163 on Map II (1910' B.).....	6	0

Stone from this quarry was used in foundations and walls at the mouth of Mine No. 2 of the Page Coal & Coke Co., and for brattices in the mine.

THE NO. 5 POCAHONTAS COAL.

The No. 5 Pocahontas Coal of White⁵, belonging 25 to 50 feet above the No. 4 Pocahontas bed, is fairly persistent and attains minable dimensions and regularity in the southern portion of Big Creek District, McDowell County. It appears to be a "split" off the true No. 4 Pocahontas seam, as only 4 feet of flaggy and sandy shale separates the latter coal from the overlying Eckman Sandstone at Pocahontas, Virginia, the last mentioned stratum having a thickness here of 45 to 50 feet. The dimensions, bed-structure and stratigraphic position of the No. 5 Pocahontas Coal are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Bradshaw, Jacob Fork, Berwind, Head of Vall Creek, Bearwallow Knob—2 Miles East, and Horsepen Creek; and in the logs, on subsequent pages in Chapter X, for Coal Test Borings Nos. 8, 10, 16, 21, 56, 60, 65-6, 71-4, 77, 83, 90-1, 96, 98, 99-101, 105-9, 110-11, 115, 121, 122-3, 127, 130, 132-4, 141, 143, 145-6, 159, 163-4, 166, 168-9, and 173 on Map II. It has never been mined commercially in the State, but its thickness and character at country banks, prospect openings and crop exposures, and its approximate minable area, as outlined on Figure 9, along with that for the Chilton Coal, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE NO. 4 POCAHONTAS COAL.

The No. 4 Pocahontas Coal of Lathrop and White⁶, belonging at its type locality—Pocahontas, Virginia—91 feet below the No. 6 Pocahontas bed and 96 feet above the No. 3 Pocahontas seam, is quite persistent and is a very valuable deposit of fuel in the territory of this Report. Here, it is generally multiple-bedded, soft and columnar and has been mined on a commercial scale in McDowell County on Clear Fork, above Coalwood; Elkhorn Creek, between Welch and Kimball; and on the waters of Tug Fork, between Wilcoe and

⁵I. C. White, Vol. II (A), W. Va. Geol. Survey, p. 104; 1908.

⁶W. A. Lathrop, "The Virginias" for June, 1884, p. 97; I. C. White, Vol. II (A), W. Va. Geol. Survey, pp. 103-4; 1908.

Thorpe, and Gary and Filbert. These are the only commercial mines on it in the State. Its thickness, bed-structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Cabin Creek Ridge, Left Fork of Allen Creek, Pineville—Sugar Run, Mouth of Whiteoak Branch, Cub Branch—Pando, Welch, Coalwood. Jacob Fork, Mouth of Long Branch, Head of Vall Creek, Bearwallow Knob—2 Miles East, Horsepen Creek, and Spice Creek; and in the logs of coal test borings, on subsequent pages in Chapter X. For ready reference to the borings recording this bed, the reader is cited to the summarized table of logs for each County, given in the same Chapter. As it belongs less than 100 feet above the No. 3 Pocahontas Coal, its outcrop should follow fairly close the same regions as that outlined for the latter bed on Map II. As mentioned on a preceding page under the description of the No. 5 Pocahontas seam, the latter appears to be a "split" off the No. 4 bed. In fact, the approximate minable area of No. 5 is mostly confined to the region where No. 4 has thinned below minable dimensions, as shown by Figures 9 and 27 in Chapter X. The thickness, character and composition of the No. 4 Pocahontas Coal, and its approximate minable area as outlined on Figure 27, along with that for the Bens Creek bed, are described on subsequent pages in Chapter X, along with an estimate of its available tonnage.

THE UPPER POCAHONTAS SANDSTONE.

At 0 to 5 feet below the coal last described, there occurs a massive to heavy-bedded, medium grained to coarse, bluish gray to buff and arenaceous stratum, ranging in thickness from 50 to 75 feet, that has been quarried quite extensively at Pocahontas, Virginia, less than 2 miles southeast of the territory of this Report. As this ledge has not been previously described, it is herein named the **Upper Pocahontas Sandstone** from the latter town, in contradistinction to the Lower Pocahontas Sandstone belonging immediately below the No. 3 Pocahontas Coal. Its thickness and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben, Maben—Southwest, Left Fork

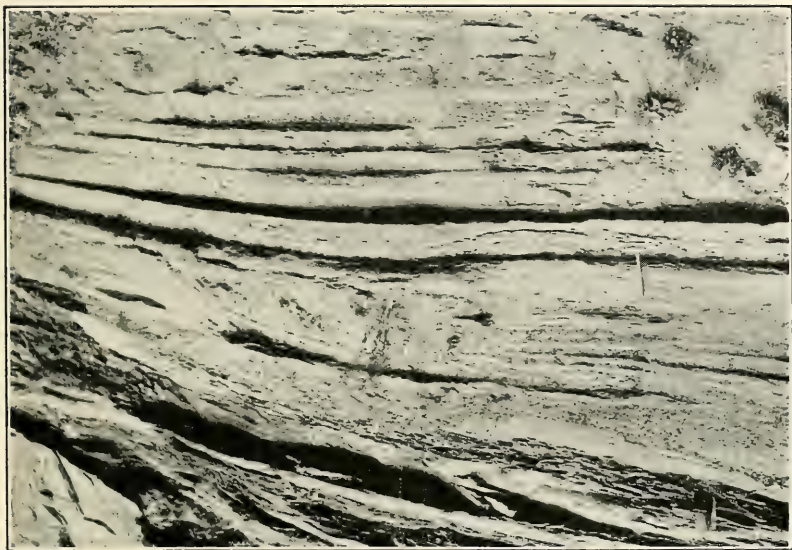


PLATE XII(a)—Showing the peculiarly weathered laminated shale (Douglas) along the N. & W. R. R. grade,
 $\frac{3}{4}$ mile northwest of Panther.

Photo by A. T. Bragonier.

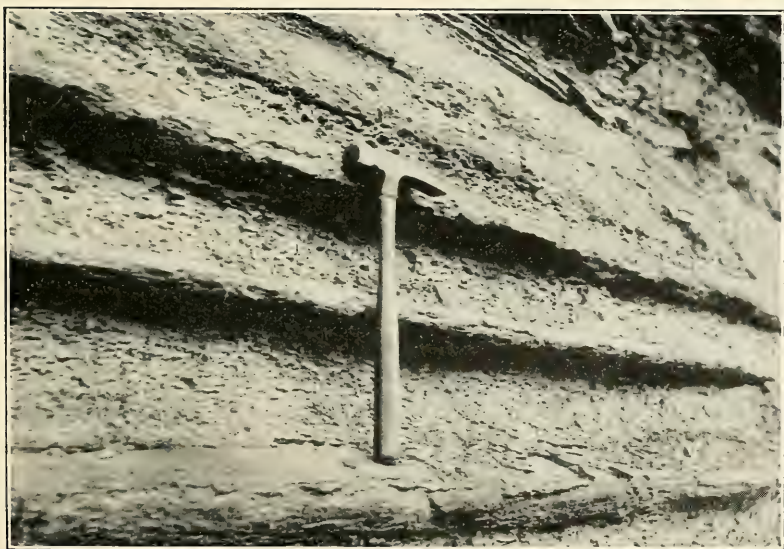


PLATE XII(b)—Ditto, with nearer view of the projecting, hard, sandy lenses, 2 to 4 inches in thickness.

Photo by A. T. Bragonier.

of Allen Creek, Pineville—Sugar Run, Mullens, Bradshaw, Berwind, Head of Vall Creek, and Horsepen Creek; and in the logs, on subsequent pages in Chapter X, for Coal Test Borings Nos. 8, 10, 13, 16, 20, 21, 45A, 47, 56, 60, 70-1, 73-4, 79, 80, 85, 104, 127-8, 130, 136, 152, 166, 168, and 172 on Map II. Its outcrop follows closely the same regions as that outlined on Map II for the No. 3 Pocahontas Coal. In Elkhorn District, McDowell County, it has been quarried to a small extent on the south hillside of Elkhorn Creek, opposite Elkhorn railway station, where the following section was measured with aneroid by the writer:

	Feet.
Concealed	
Sandstone, Upper Pocahontas, medium grained, bluish gray	30
Concealed, to horizon of No. 3 Pocahontas Coal.....	20
Elevation of quarry, 2020' B.	

Stone from the above quarry was used in the construction of the retaining walls along the banks of Elkhorn Creek, just above the railway station for the town of Elkhorn, where it presents an attractive appearance.

Three and a half miles southeastward, the writer measured the following section at another quarry on this ledge on the south hillside of the same stream, $\frac{3}{4}$ mile southeast of the mouth of Little Creek:

	Feet.
Concealed	
Sandstone, Upper Pocahontas, heavy-bedded, medium grained, micaceous, buff to bluish gray, quarry ledge, (2355' B.)	25
Concealed	20
Shale, buff	3
Coal, No. 3 Pocahontas, at Mine No. 145 on Map II.	8

It is probably too high in its percentage of alumina to give the same results when crushed and used in the manufacture of concrete as the more quartzitic ledges of the New River Group, described on preceding pages in Chapter VI, but its numerous cliff exposures in each County should furnish an abundance of stone for use in buildings and foundations.

THE NO. 3 POCAHONTAS "RIDER" COAL.

When the stratum last described is more or less divided by shale partings, there frequently occurs a soft, columnar, and bituminous stratum, 20 to 30 feet above the No. 3 Pocahontas bed, that has not been previously named. It is herein designated the **No. 3 Pocahontas "Rider" Coal**. The seam is too thin and irregular to be classed as a minable bed, as it seldom exceeds one foot in thickness. Its dimensions and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV, for Pineville—Sugar Run, Whiteoak Branch, Clarks Gap, and Welch; and in the logs, on subsequent pages in Chapter X, for Coal Test Borings Nos. 96, 115, 121, 122 and 124.

THE NO. 3 POCAHONTAS COAL.

The No. 3 Pocahontas Coal of Hotchkiss, Lathrop⁷ and White, belonging at its type locality—Pocahontas, Virginia—less than 2 miles southeast of the territory of this Report—96 feet below the No. 4 Pocahontas bed, directly below the sandstone last described and 67 feet above the No. 2 Pocahontas Coal, is by far the most important bed from a commercial standpoint in either County; in fact, it has been ranked as second only to the great Pittsburgh Coal as the most valuable bed in the entire Appalachian field. It is generally multiple-bedded, soft and columnar, and over a large portion of the area ranges in thickness from 3 to 9 feet. The following is the type section of the bed at Pocahontas, Virginia:

				Ft.	In.
Coal, soft, columnar.....	10'	0"			
Slate	0	3			
Coal, soft, columnar.....	1	0	....	11	3

In southeastern Wyoming County, its bed section is somewhat different, where the following section closely represents its occurrence:

⁷W. A. Lathrop, "The Virginias" for June, 1884, p. 97; and I. C. White, W. Va. Geol. Survey, Vol. II, pp. 689-690; 1903; and Vol. II (A), pp. 103-4; 1908; and Bulletin 65, U. S. Geol. Survey, pp. 203-204; 1891.

			Ft.	In.
Coal, soft, columnar.....	1'	2"		
Coal, gray and hard, to bone....	0	6		
Coal, soft, columnar.....	2	8	4	4

In the Berwind region of McDowell, it has about the same thickness, but its section is the converse of that last given, in that the parting bone has here divided it into two unequal benches, the upper being about double that of the lower in thickness.

Its dimensions, bed-structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given on preceding pages in Chapter IV, and in the logs of coal test borings, on subsequent pages in Chapter X. For ready reference to the borings recording this bed, the reader is cited to the summarized table of logs for each County, given in the same Chapter. Its outcrop is outlined in detail on Map II, and its elevation above sea level is exhibited on the same map by means of the **red structure contours**, southeastward from its 1000-foot level. Northwestward from this line, its elevation may be readily determined by subtracting its interval below the Sewell Coal, as given for several points in the tables at the beginning of Chapter III, from the elevation of the latter bed as shown by the green structure contours on the same map at the point desired.

The No. 3 Pocahontas Coal is the only seam that has been mined on a commercial scale in Wyoming County, the operations on which are at present confined to the southeastern border of Slab Fork District. In McDowell, this coal is mined commercially on Elkhorn Creek from Olmsted to its headwaters at Crumpler and Coaldale; on Tug Fork, from the mouth of Shannon Branch to Jenkinjones; and on Dry Fork, above Berwind. Its thickness, character and composition at these commercial mines, country banks and prospect openings, and its approximate minable area, as outlined on Figure 28, along with that for the Cedar Coal, are described on subsequent pages in Chapter X, together with an estimate of its available tonnage.

Since the completion of the field work in Wyoming and McDowell by Gawthrop and the writer, C. E. Krebs has dis-

covered marine fossils in the roof shale of the No. 3 Pocahontas Coal on Barkers Creek in the former County, and on Devils Fork in Raleigh County.

THE LOWER POCAHONTAS SANDSTONE.

The 50 to 60 feet of interval, separating the formation last described from the No. 2 Pocahontas Coal below, is generally mostly occupied by a massive to heavy-bedded, medium grained, buff to bluish gray, micaceous and arenaceous stratum, ranging in thickness from 20 to 50 feet, that has not been previously described. It is herein designated the **Lower Pocahontas Sandstone** from its close association below the Upper Pocahontas ledge. Its thickness, character and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Little Whiteoak Creek, Clarks Gap, Avondale, Coalwood, Mouth of Long Branch, Berwind, Bearwallow Knob—2 Miles East, and Spice Creek; and in the logs, on subsequent pages in Chapter X, for Coal Test Borings Nos. 8, 10, 13, 16, 70, 73, 108, 122-4, 128, 132 and 168 on Map II. Its outcrop should follow closely the same region as that outlined for the No. 3 Pocahontas Coal on Map II. No quarries were observed on it in Wyoming County, but near Gary and Berwind in McDowell, it has been worked for use in buildings and foundations.

The following section was measured by Gawthrop at a quarry on this ledge on the north side of Tug Fork, near Gary, just east of the mouth of Adkin Branch:

	Feet.
Coal, No. 3 Pocahontas, 2' visible.....	2
Fire clay shale.....	2
Sandstone, shaly..... 5' }	Lower Pocahontas. 40
Sandstone, massive, fine grained, medium hard, micaceous, gray, quarry ledge.....35 }	
Concealed	
Elevation of quarry, 1475' B.	

Stone from this quarry was used in foundations, retaining walls and the bank building at Gary. According to Gawthrop, stone from this ledge on the opposite side of Tug Fork was used in the construction of the stable, foundry, store and

chemical laboratory of the United States Coal & Coke Co. at Gary. It not only presents an attractive appearance, but also seems to possess durable qualities, in that exposure to the weather has affected the stone but slightly during a period of almost 10 years.

The following section was measured by the writer at a quarry on this sandstone, flush with the N. & W. Railway grade, along the north side of Dry Fork, 1.3 miles southeast of the station at Berwind:

	Feet.
Coal, No. 3 Pocahontas.....	
Concealed	5
Sandstone, broken, irregular...18'	} Lower Pocahontas 31
Sandstone, massive, medium grained, bluish gray, cement- ing material mostly silica, quarry ledge.....13'	
Elevation of quarry, 1535' B.	

The same ledge has been quarried about 250 yards eastward along the railway grade, where 30 to 35 feet of the massive portion of the stratum is exposed. Stone from both these operations was used in the construction of the Berwind National Bank Building and the power house of the New River and Pocahontas Consolidated Coal & Coke Co. at this place, where it gives practically the same results as described above for the Gary region. Crushed stone from it and the Upper Pocahontas was used by the County in macadamizing the improved public highway between Berwind and Canebrake, where its fair cementing properties are amply demonstrated, this road standing very well the light traffic to which it has been subjected. The stone resembles very much in physical appearance the Flattop Mountain ledge at Rift and the south edge of Berwind, the physical tests of which are given on subsequent pages in Chapter X.

The following section was measured at the **Tony Iafolla quarry** on this ledge, along the west bank of Dry Fork, opposite the highway bridge over this stream, 0.3 mile north of Canebrake:

	Feet.
Coal, No. 3 Pocahontas horizon.....	
Concealed	35
Sandstone, broken, shaly at bot- tom	12'
Sandstone, massive, medium grained, bluish gray, quarry ledge	10
Elevation of quarry, 1520' B.	
Lower Pocahontas	
	22

Here it splits readily into blocks of any desired size. The quarry was in operation when visited by the writer in September, 1914, the output from which was being used in the construction of the stone store building at Canebrake.

THE NO. 2 "A" POCAHONTAS COAL.

When the sandstone last described is more or less broken up by shale, there sometimes occurs a thin, slaty and impure bituminous stratum, 20 to 30 feet above the No. 2 Pocahontas bed, that has not been previously described. It is herein named the **No. 2 "A" Pocahontas Coal** from its intimate association above the former seam. Its thickness, bed-structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Maben—Southwest, Left Fork of Allen Creek and Bearwallow Knob—2 Miles East; and in the logs, on subsequent pages in Chapter X, for Coal Test Borings Nos. 7, 13, 17A, 58, 59, 70 and 96 on Map II. As it seldom contains more than one foot of clean coal, it has not been classed as a minable bed. Its occurrence at crop exposures was observed more frequently in southeastern Wyoming County, where it serves as a marker in prospecting for the valuable No. 3 Pocahontas seam in the same region.

THE NO. 2 POCAHONTAS COAL.

The No. 2 Pocahontas Coal of Lathrop⁸ and White, belonging at its type locality—Pocahontas, Virginia—67 feet below the No. 3 Pocahontas bed and 28 feet above the No. 1

⁸W. A. Lathrop, "The Virginias," for June, 1884, p. 97; and I. C. White, W. Va. Geol. Survey, Vol. II, pp. 689-690; 1903; and Vol. II (A), pp. 103-4; 1908.

Pocahontas seam, is very persistent in southeastern Wyoming and McDowell, where it is generally multiple-bedded, soft and columnar, seldom exceeding 24 inches in thickness, including its parting slates. It has never been mined commercially in the State and has not been classed as a minable bed in this Report, owing to its thinness and irregularity. Its dimensions, bed-structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Left Fork of Allen Creek, Little Whiteoak Creek, Berwind, and Bearwallow Knob—2 Miles East; and in the logs, on subsequent pages in Chapter X, for Coal Test Borings Nos. 7, 8, 13, 17A, 47, 52, 54, 58, 70, 123, and 132 on Map II. As it belongs only 50 to 70 feet below the No. 3 Pocahontas Coal, its outcrop should follow fairly close the same region as that outlined for the latter bed on Map II. It appears to attain its best development in the southeast portion of Slab Fork and the northeast corner of Barkers Ridge District, Wyoming County. In this region the following section was measured by the writer with hand-level in a Virginian Railway cut, 1¼ miles northward from Mullens and 0.4 mile north of the mouth of Terry Branch. The section is important in that the true relative position of the No. 2 "A" Pocahontas bed is also shown:

	Thickness Feet.	Total Feet.	
Sandstone, massive, Upper Pocahontas ..	15	15	
Coal, No. 3 Pocahontas , (1580' B.).....	3.8	18.8	18.8'
Fire clay	6	24.8	
Shale, gray, sandy.....	8	32.8	
Sandstone, massive, Lower Pocahontas , upper division.....	10	42.8	
Shale, sandy	6	48.8	
Coal , soft..0' 5" }			
Shale, gray..2 6 }			
Coal , soft..0 3 } No. 2 "A" Pocahontas ..	4	52.8	34.0'
Shale, gray..0 6 }			
Coal , soft..0 4 }			
Sandstone, shaly, Lower Pocahontas , low- er division	15	67.8	
Shale, sandy	4.2	72.0	
Coal , soft, No. 2 Pocahontas	1.7	73.7	20.9'
Fire clay shale.....	7.1	80.8	
Sandstone, massive, Vivian , to railway grade	12	92.8	19.1

Two and a half miles southwestward at a crop exposure along the south hillside of Guyandot River, 1 mile southwest of Mullens, it is only 12 inches in thickness, 57 feet below the No. 3 Pocahontas Coal and 33 feet above the No. 1 Pocahontas bed, as determined with hand-level by the writer.

The following section was measured by Gawthrop in the northeastern point of Barkers Ridge District (Wyoming) at a crop exposure along the south side of Guyandot River in a Virginian Railway cut:

		Ft.	In.
Shale, sandy, brownish gray.....		10	0
Coal, soft, columnar...0' 7"	} No. 2 Pocahontas.. (1530' B.)	2	3
Coal, bony.....0 3			
Coal, soft, columnar....0 10			
Bone.....0 1			
Coal, harder.....0 6			
Shale, to railway grade.....		3	0

This was about the maximum thickness observed for the No. 2 Pocahontas Coal. Many other sections of the seam were determined at scattered points in both counties, but its generally impure and irregular character as represented by these would not warrant space in this Report for their description.

THE VIVIAN SANDSTONE.

Immediately below the coal last described and directly above the No. 1 Pocahontas bed, there occurs a massive to heavy-bedded, medium grained, micaceous, bluish gray and arenaceous stratum, on Elkhorn Creek in McDowell that has not been previously described. It has been quarried for building purposes on the south side of this stream, 300 yards east of the East Vivian railway station, and for that reason it is herein designated the **Vivian Sandstone**. The writer obtained the following data at the quarry in question:

	Ft.	In.
Sandstone, platy, Lower Pocahontas.....	20	0
Coal, No. 2 Pocahontas.....	1	4
Fire clay shale.....	4	0
Sandstone, Vivian, quarry ledge, massive, medium grained, micaceous, light gray to base of quarry (elevation of quarry, 1540' B.).....	17	0

Stone from this quarry was used in foundations for coal mine tipples in the immediate locality.

The following section was measured at another quarry on this ledge immediately northeast of North Fork:

	Feet.
Coal, No. 3 Pocahontas (1880' B.).....	
Shale and concealed.....	65
Sandstone, Vivian, quarry ledge, light gray to buff, medium grained to base of quarry (1780' B.).....	35

Stone from this quarry was used in the construction of the coke ovens of the Algoma Coal & Coke Co., just above North Fork station.

Farther up Elkhorn, the writer measured the following section at a quarry on the north side of the creek, 0.1 mile west of Elkhorn town:

		Ft.	In.
Shale		15	0
Coal, soft 1' 0" }	No. 2 Pocahontas... (1935' B.)	3	11
Shale, dark gray.. 0 5 }			
Coal 2 6 }			
Sandstone, Vivian, quarry ledge, massive, medium grained, bluish gray to base of quarry ..		20	0

The elevation of the quarry is 1910' B., the face being about 125 feet long and worked back into the hill a distance of 20 feet.

In Adkin District (McDowell), this ledge has been quarried on the south side of Tug Fork at the mouth of Belcher Branch, 0.8 mile southeast of Gary, where the following section was measured by Gawthrop:

		Ft.	In.
Concealed			
Shale, sandy		3	0
Coal, soft, columnar ...0' 10" }	No. 2 Pocahontas. (1500' B.)	2	0
Fire clay shale.....0 6 }			
Coal, soft, columnar ...0 5 }			
Shale .....0 1 }			
Coal, soft.....0 2 }			
Fire clay shale		4	0
Sandstone, Vivian, quarry ledge, massive, medium grained, brownish gray to base of quarry (1485' B.)		10	0
Concealed		36	0
Coal, No. 1 Pocahontas		0	6

Here the base of the quarry comes 80 to 90 feet below the No. 3 Pocahontas Coal. Stone from it was used mostly for foundations of buildings in the immediate locality.

In Wyoming County, only one quarry was observed on this ledge; viz, in a Virginian Railway cut at the north edge of Mullens, where the following section was measured by the writer:

	Ft.	In.
Coal, No. 3 Pocahontas, horizon concealed, estimated	4	6
Unrecorded and concealed.....	50	0
Sandstone, massive	5	0
Shale, sandy and dark.....	2	0
Coal, soft, columnar, No. 2 Pocahontas, (1490' B.)	1	7
Fire clay and green shale.....	7	0
Shale, sandy	4	0
Sandstone, Vivian, quarry ledge, to base of quarry	10	0
Concealed	15	0
Sandstone and concealed to railway grade.....	35	0

The above quarry was not in operation when visited in 1914.

THE NO. 1 POCAHONTAS COAL.

The No. 1 Pocahontas Coal of Lathrop⁹ and White, belonging at its type locality—Pocahontas, Virginia—90 to 100 feet below the No. 3 Pocahontas bed and 25 to 30 feet below the No. 2 Pocahontas seam, is fairly persistent in southeastern Wyoming and McDowell, but as it seldom exceeds 15 inches in thickness, it has not been classed as a minable coal in this Report. Its dimensions, bed-structure and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Little Whiteoak Creek, Bailey Chapel, Avondale and Berwind; and in the logs, on subsequent pages in Chapter X, for Coal Test Borings Nos. 7, 10, 45A, 58, 65, 123, 128 and 168 on Map II. In Wyoming County the writer measured the following section with hand-level at its crop along the Virginian Railway grade, 1.2 miles southwest of Mullens:

⁹W. A. Lathrop, "The Virginias" for June, 1884, p. 97; and I. C. White, W. Va. Geol. Survey, Vol. II, pp. 689-690; 1903; and Vol. II (A), pp. 103-4; 1908.

	Thickness Feet.	Total Feet.
Coal, soft.....1' 0" }		
Bone, 1" to.....0 3 }		
Coal, soft.....0 4 }	No. 3 Pocahontas. (1526' L.)	4.5
Bone .....0 2 }		
Coal, soft.....2 9 }		
Shale and sandstone, mixed.....	10	14.5
Concealed, mostly sandstone.....	41.7	56.2
Sandstone, Lower Pocahontas	4	60.2
Fire clay shale.....	1	61.2
Coal, soft, No. 2 Pocahontas , (1468' L.)....	1	62.2
Fire clay shale.....	2	64.2
Concealed	17	81.2
Sandstone, Vivian	11	92.2
Shale	3	95.2
Coal, soft, No. 1 Pocahontas	0.3	95.5
Fire clay shale.....	3	98.5
Sandstone, shaly and flaggy, Landgraff , to railway grade	17.7	116.2
		20.7'

In McDowell County, the following section was measured by the writer at its crop on the south side of Elkhorn Creek, $\frac{1}{2}$ mile northwest of Landgraff:

	Ft.	In.
Interval from No. 3 Pocahontas Coal.....	50	0
Sandstone, Vivian , massive.....	40	0
Coal, soft, No. 1 Pocahontas , (1585').....	1	3
Fire clay shale.....	5	0
Shale, sandy, dark, flaggy at bottom.....	10	0
Coal, soft, local.....	0	4
Fire clay shale.....	1	0
Sandstone, Landgraff , to railway grade.....	5	0

From the foregoing data, it is quite evident that the No. 1 Pocahontas Coal is too thin and irregular to have any economic value, but it serves as a valuable marker in correlating the adjacent members of the Pocahontas Group.

THE LANDGRAFF SANDSTONE.

Immediately below the coal last described, there occurs a massive, medium grained, micaceous, buff, lenticular and arenaceous stratum, ranging in thickness from 0 to 25 feet and once quarried at Landgraff, McDowell County, that has not been previously described. It is herein named from the latter town the **Landgraff Sandstone**. Its thickness and stratigraphic position are exhibited in the general sections of the

Pottsville Measures given in Chapter IV for Little Whiteoak Creek, Keystone, and Coalwood; and in the logs, on subsequent pages in Chapter X for Coal Test Borings Nos. 45A, 71, 123, and 128 on Map II. The quarry on this ledge, mentioned above, is located on the south bank of Elkhorn Creek, and its base belongs 130 feet below the No. 3 Pocahontas Coal, stone from it being used in the construction of the bridge over the latter stream at this point.

Farther up Elkhorn, it is this ledge that has been quarried on the north side of the creek at Eckman, just west of the former residence of Gov. H. D. Hatfield, where the following section was measured by the writer:

	Ft.	In.
Concealed from No. 3 Pocahontas Coal horizon	45	0
Sandstone, Vivian.....	30	0
Concealed and coal blossom.....	5	0
Fire clay shale and buff shale.....	10	0
Coal, No. 1 Pocahontas.....	0	4
Shale, sandy.....	1	0
Sandstone, Landgraff, quarry ledge, massive, medium grained, micaceous, buff, (1630' B.)...	18	0
Shale, buff.....	3	0
Coal, Landgraff.....	0	2
Shale		

It is this stratum that has been quarried at an elevation of 1745' B. on the south side of Elkhorn Creek, 250 yards west of North Fork railway station, where it comes 7 feet above the Landgraff Coal, and its base about 125 feet below the No. 3 Pocahontas bed, as determined by the writer.

Farther up Elkhorn, it has been quarried on the south hillside of the Creek, 0.7 mile southeast of Maybeury railway station, at an elevation of 2160' B., its base coming here about 150 feet below the No. 3 Pocahontas Coal. Stone from this quarry was used in the construction of the coke ovens in this region, belonging to the Elkhorn Coal & Coke Company.

THE LANDGRAFF COAL.

Immediately at the base of the sandstone last described, there occurs a thin and impure bituminous stratum near Landgraff, McDowell County, seldom exceeding 6 inches in thickness, that has not been previously described. It is herein des-

ignated the **Landgraft Coal** from the latter town near which its crop is exposed directly below the sandstone of the same name, as exhibited in the section last given. It is also recorded in the log of boring No. 71 on Map II, published in Chapter X. It is too thin to be of any economic importance, but it serves as an aid in correlating the adjacent sandstone ledges.

THE KEYSTONE SANDSTONE.

At Keystone, McDowell County, there belongs immediately below the coal last described, a massive, medium grained, micaceous, buff and arenaceous stratum, ranging in thickness from 15 to 25 feet, that has not been previously described. It is herein designated the **Keystone Sandstone** from the latter town, where its crop is exposed in a cliff directly above the coal of the same name. Its thickness and stratigraphic position are exhibited in the general sections of the Pottsville Measures given in Chapter IV for Little Whiteoak Creek and Keystone, pages 77 and 107, respectively; and in the log of Coal Test Boring No. 123 on Map II, on a subsequent page in Chapter X. It was once quarried slightly along the south bank of Elkhorn Creek, 250 yards west of North Fork railway station, where the following section was measured with aneroid by the writer:

	Feet.
Coal, No. 3 Pocahontas, horizon.....	
Concealed and shale.....	80
Sandstone, Landgraft , massive, bluish gray, quarried....	45
Shale, sandy.....	7
Black slate, blocky....0' 6" } Landgraft Coal	0.7
Coal .....0 2 }	
Shale, gray and sandy.....	1
Sandstone, Keystone , quarried slightly.....	30
Coal .....0' 1" }	
Shale, gray.....2 6 } Keystone	3
Coal .....0 3 }	
Shale, dark.....	4
Sandstone, dark, laminated.....	6
Shale, dark, sandy, to road.....	10

Farther up Elkhorn it has been quarried on the south bank of the Creek, 0.4 mile southwest of Powhatan, at an elevation of 1840' B., where the following section was measured with aneroid by the writer:

	Ft.	In.
Concealed		
Shale, blue and buff.....	18	0
Slate, black.....	0	4
Coal, Landgraff.....	0	4
Fire clay and shale.....	2	0
Sandstone, shaly and laminated.....	5	0
Sandstone, Keystone, quarry ledge, massive, fine grained, bluish gray to base of quarry (1840' B.).....	20	0

In Adkin District, same County, this stratum has been quarried on the east hillside of Harman Branch of Tug Fork, $\frac{1}{4}$ mile northeast of Thorpe, at an elevation of 1550' B., about 150 feet below, where the following section was measured by Gawthrop:

	Feet.
Concealed	
Sandstone, shaly, gray.....	10'
Sandstone, Keystone, massive, medium grained, brown, quarry ledge.....	15 25

Stone from the above quarry was used in the construction of retaining walls, coke ovens and foundations in the immediate locality.

THE KEYSTONE COAL.

As shown by the Keystone Section in Chapter IV on page 107, there occurs a thin—3 inches—bituminous stratum, 2 to 3 feet below the sandstone last described at the railway station for Keystone, McDowell County, that has not been previously named. It is herein designated the **Keystone Coal**. It is also given in one of the sections above under the account of the sandstone of the same name and in that for Little Whiteoak Creek, page 77. The log of Coal Test Boring No. 105 on Map II, located 1 mile northeast of Canebroke, in the southern portion of Big Creek District, McDowell, gives 27 inches of coal with 6 inches of sandstone 5 inches below its top, 125 feet below the No. 3 Pocahontas bed, that appears to belong at this horizon, although it may possibly correlate with the Landgraff seam. It is too thin and impure to be of any economic importance, but is of scientific interest, in that it is quite persistent and serves as an aid in correlating the adjacent members of the Pocahontas Group.

THE NORTH FORK SHALE.

At 10 to 15 feet below the coal last described, there outcrops flush with the N. & W. Railway grade at North Fork, a black shale with thin—1 to 2 inches—lenses of iron ore, the whole ranging in thickness from 5 to 10 feet. **Marine fossils** were first discovered in this stratum at this point by the writer in 1914, and as it has not been previously named, it is herein designated the **North Fork Shale**. Its thickness and stratigraphic position are exhibited in the logs of Coal Test Borings Nos. 52 and 123 on Map II given on subsequent pages in Chapter X. At North Fork, its base comes 175 feet below the No. 3 Pocahontas Coal, as determined with aneroid by the writer. Farther up Elkhorn the latter measured the following section at its crop exposure on the south bank of the creek, at Powhatan:

	Feet.
Sandstone	5
Shale, North Fork, black, with lenses of iron ore and marine fossils, (1815' B.).....	8
Sandstone, shaly, and sandy shale, greenish.....	10

Here its base comes about 160 feet below the No. 3 Pocahontas Coal.

The fossil shells are very thin, fragile and flattened, and for this reason they were at first mistaken for fossil insect wings. Only one form, apparently a pelecypod, was seen, although the specimens are abundant.

The writer observed the same formation with its accompanying marine fauna at a crop exposure in the hill road leading northward from Simmons, Mercer County, at an elevation of 2335' B., about 200 feet below the No. 3 Pocahontas Coal and directly above 6 inches of coal that is described next below.

THE SIMMONS COAL.

Immediately at the base of the formation last described and 180 to 200 feet below the No. 3 Pocahontas Coal, a thin—6 to 12 inches—bituminous stratum crops in the hill road just northwest of Simmons, Mercer County, at an elevation of 2335' B., as determined by the writer, that has not been pre-

viously named. It is herein designated the **Simmons Coal** from the latter town. In the territory of this Report, its thickness and stratigraphic position are exhibited in the general section for Left Fork of Allen Creek, page 72; and in the logs given on subsequent pages in Chapter X for Coal Test Borings Nos. 52 and 123 on Map II. It is 3 inches in thickness at a crop exposure at the south portal of the Hartwell tunnel, just below the mouth of Vall Creek in Big Creek District (McDowell), at an elevation of 1705' B., 210 to 225 feet below the No. 3 Pocahontas Coal and 25 to 30 feet above the top of the Mauch Chunk Red Shale, as determined with aneroid by the writer. Three miles northeastward, Gawthrop measured the following section at what appears to be the crop of this bed in the road, just below Cucumber P. O., where it comes about 210 below the No. 3 Pocahontas Coal:

		Ft.	In.
Concealed			
Shale		2	0
Coal, soft, columnar.1' 1" }	} Simmons (1680' B.)	2	3
Coal, bony.....0 4 }			
Coal, soft, columnar.0 10 }			
Shale and concealed.....			

This is the thickest exposure observed for the Simmons Coal, and it is probably only a local thickening. It is generally too thin and irregular to be of any economic value and it has not been classed as a minable bed in this Report.

THE SQUIRE JIM COAL.

At 300 feet below the No. 3 Pocahontas Coal, there outcrops a multiple-bedded, soft and columnar bed along the north side of North Fork of Big Creek, 1.3 miles northeastward from Squire Jim in the southeast portion of Big Creek District, McDowell County. As this seam has not been previously described, it is herein designated the **Squire Jim Coal** from the latter point. Here Gawthrop measured the following section at its exposure in an old road:

	Ft.	In.
Concealed		
Shale	1	0
Coal, soft.....2' 0" }		
Bone and slate...0 4 }		
Coal, soft.....0 3 }		
Shale and concealed.....	2	7

Three-tenths mile southwestward, according to Gawthrop, this coal was once mined for domestic fuel by Rater Meyers, who reported it 2 feet in thickness. Its development is evidently quite local, as it was not observed at any point away from this immediate region, nor was it recorded in the logs of several borings which penetrated its horizon.

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CHAPTER VIII.

STRATIGRAPHY---MISSISSIPPIAN---MAUCH CHUNK SERIES.

GENERAL ACCOUNT.

The Mississippian, or Lower Carboniferous division of the rock column, as limited in the Appalachian region of North America, includes the Mauch Chunk, Greenbrier Limestone and Pocono Sandstone Series in descending order, and in the territory of this Report, only the upper portion of the first of the latter three groups outcrops, the details of which are shown by appropriate symbol on Map II. The latter feature is confined entirely to the southeast portions of Adkin and Big Creek Districts (McDowell), along the crest of the Dry Fork Anticline, where the waters of Tug and Dry Forks have cut their deeply trenched valleys from 100 to 600 feet below the base of the immediately overlying Pocahontas Group.

The Mauch Chunk Measures, as represented at the surface in McDowell County, contain no characteristic strata on which to base subdivisions, as its rocks are largely made up of red and green shales, alternating with greenish gray to reddish brown, micaceous and argillaceous sandstones, the whole correlating with the **Bluestone Formation** of M. R. Campbell, as exhibited in the Columnar Section accompanying Pocahontas Folio, No. 26 of the United States Geological Survey, published in 1896. A fair idea of their character is exhibited in the general sections in Chapter IV for Squire Jim—1 Mile Northwest, and Spice Creek, pages 115 and 122, respectively, the latter being the maximum exposure of the Series observed. Just what thickness of the Mauch Chunk lies below drainage at this point on Spice Creek is problematical. According to

the table of intervals from the Sewell Coal to the several oil and gas zones, given on a subsequent page in Chapter IX, a total of 2300 feet is a rough estimate, making that for the Series—above and below drainage—2800 to 3000 feet. The well known **Maxton** Oil and Gas Sand of the western counties of the State has been provisionally correlated, in the table last mentioned, with the Princeton Conglomerate of Campbell¹, belonging at its type locality—Princeton, Mercer County—800 feet below the base of the Pocahontas Group.

DESCRIPTION OF SPECIAL FORMATIONS.

There is a complete absence of coal beds in the Mauch Chunk Series of McDowell County, so that its economic features are confined to its sandstone ledges which have been quarried to some extent, and to its red and argillaceous shales which should burn into a fair quality of brick, especially for building purposes. The areal extent of these measures is so limited that their influence on the soil is not so marked as might be expected, owing to the talus and debris from the overlying Pocahontas Group. The composition and character of the shales will be described on subsequent pages in Chapter XI, under "Stratified Shales." Its sandstones that have been quarried will now be described in descending order.

THE PAGETON SANDSTONE.

At 250 feet below the No. 3 Pocahontas Coal and 10 to 25 feet below the top of the Mauch Chunk Series, there occurs an arenaceous ledge at Pageton, McDowell County, that has not been previously described. It has been quarried at this point for building purposes and for that reason is herein designated the **Pageton Sandstone**. The following section was measured at a quarry on the north side of the N. & W. Railway, one-eighth mile above the mouth of Belcher Branch:

¹M. R. Campbell, Pocahontas Folio, No. 26, U. S. G. Survey; 1896.

	Feet.
Shale, red.....	
Sandstone, massive, medium grained, brownish gray.....20'	} Pageton.. 40 (quarried) (1665' B.)
Sandstone, broken, flaggy..... 5	
Sandstone, massive, brownish gray.....10	
Sandstone, massive, gray, micaceous..... 5	
Concealed	35
Shale, red.....	5
Sandstone, brown.....	2
Shale, red.....	3

Stone from the above quarry was used in the construction of the coke ovens at Pageton and in foundations for houses.

THE HARTWELL SANDSTONE.

In Big Creek District, McDowell County, at Hartwell, on Dry Fork, there occurs an arenaceous stratum, 345 feet below the No. 3 Pocahontas Coal and 50 to 75 feet below the base of the Pocahontas Group, that has not been previously described, unless it should prove to be the Pageton ledge. It is this formation that extends 25 to 30 feet above the bed of Dry Fork at Hartwell, and that is quarried one-half mile southeast of the same place. Hence, it is herein designated the **Hartwell Sandstone**. The writer measured the following section at a quarry on this ledge along the east hillside of Dry Fork, 0.6 mile southeast of the mouth of Vall Creek:

	Feet.
Shale, brown and sandy.....	
Sandstone, Hartwell, massive, fine grained, micaceous, olive green in color, quarry ledge.....	30
Concealed	30
Shale, red, to N. & W. Ry. grade.....	40

The elevation of the base of the quarry is 1710' B., and its face is about 100 feet long and is worked back into the hill 15 to 25 feet. No other quarries were observed on this ledge.

THE BALLARD HARMON SANDSTONE.

In Adkin District (McDowell), an arenaceous stratum, belonging about 500 feet below the No. 3 Pocahontas Coal, has been quarried to a small extent on the southwest side of Tug Fork, just below the mouth of Ballard Harmon Branch,

slightly over a mile northwest of Jenkinjones. As this ledge has not been previously described, it is herein designated the **Ballard Harmon Sandstone**. The following section was measured at the quarry in question by Gawthrop:

	Feet.
Concealed	
Shale, red.....	8
Sandstone, shaly..... 5' }	Ballard Harmon... 15 (1845' B.)
Sandstone, massive, hard, fine grained, gray.....10 }	
Concealed to run.....	6

Stone from this quarry was used in the construction of retaining walls and house foundations in the immediate locality. No other quarries were observed on this ledge.

THE ANAWALT SANDSTONE.

At the southwest edge of the town of Anawalt in Adkin District (McDowell), opposite the mouth of Little Creek, an arenaceous stratum, belonging 550 feet below the No. 3 Pocahontas Coal, has been quarried for foundation stone locally. As this formation has not been previously described, it is herein designated the **Anawalt Sandstone**. The following section was measured by Gawthrop at the quarry in question:

	Feet.
1. Concealed, with red shale.....	
2. Sandstone, shaly..... 3' }	Anawalt.. 23 (1730' B.)
3. Sandstone, massive, fine grained, greenish gray..... 5 }	
4. Sandstone, broken, somewhat flaggy. 5 }	
5. Sandstone, massive, medium hard, fine grained, brownish gray.....10 }	
6. Concealed, with red shale, to run.....	55

According to Gawthrop, No. 5 of the above section is the best portion of the stratum. No other quarries were observed on this ledge.

PART III.

Mineral Resources.

CHAPTER IX.

PETROLEUM AND NATURAL GAS.

THE OIL AND GAS HORIZONS OF WEST VIRGINIA.

Hard sandstone beds, called “sands”, constitute the principal type of the developed oil and gas producing zones in West Virginia, the single exception being the Greenbrier Limestone (“Big Lime” of the drillers), the latter having produced some petroleum and natural gas from wells in Cabell, Wayne, Lincoln, Logan and Mingo Counties, in the southwest border of the State, and even here this formation is more or less sandy, so much so that it is difficult for the driller to determine where the Big Lime leaves off and the underlying Big Injun Sand begins. For the guidance of the operator, the following table, as published on page 388 of the Monongalia-Marion-Taylor County Report, is given to show the succession in descending order of all the developed oil and gas horizons in West Virginia:

The Oil and Gas Horizons of West Virginia.

Carboniferous.	Monongahela Series	{ Carroll Sand (Uniontown).
		{ Minshall (Connellsville).
		{ Murphy (Morgantown).
	Conemaugh Series	{ Moundsville (Saltsburg).
		{ First Cow Run (Little Dunkard) Sand (Buffalo).
		{ Big Dunkard Sand (Mahoning).
	Allegheny Series	{ Burning Springs (Upper Freeport) Sand.
		{ Gas Sand (Lower Freeport).
	Pottsville Series	{ Gas Sand of Marion and Monongalia Counties (Homewood), Second Cow Run of Ohio.
		{ Gas Sand of Cairo.
		{ Salt Sand of Cairo.
		{ Cairo?
	Mauch Chunk Red Shale	{ Maxton, Dawson, Cairo.
	Greenbrier Limestone	{ "Big Lime"; not generally productive.
	Pocono Sandstones	{ Keener Sand and Beckett Sand of Milton.
		{ Big Injun Sand.
		{ Squaw Sand.
		{ Berea Grit.
Devonian.	Catskill Red Beds	{ Gantz Sand.
		{ Fifty-foot Sand.
		{ Thirty-foot Sand.
		{ Stray Sand.
		{ Gordon Sand.
		{ Fourth Sand.
		{ McDonald or Fifth Sand.
		{ Bayard or Sixth Sand.
		{ Elizabeth or Seventh Sand.
	Chemung and Portage Beds	{ Warren First or Second Tiona, Speechley Sand. No well defined oil or gas horizons yet discovered in West Virginia.

In the territory of this Report, all the zones in the Monongahela, Conemaugh and Allegheny Series pass into the air above the summits of the highest knobs, and as mentioned on preceding pages in Chapter IV the entire Pottsville Series crops to the surface and many coal test borings penetrated its

members where they lie deep below drainage, thus giving an opportunity to study the lithology and persistence of its sandstone beds.

LACK OF DEVELOPMENT.

Not a single test well has ever been sunk in either County for petroleum and natural gas, so that there are absolutely no data to determine the continuity of the producing zones of the Mauch Chunk, Greenbrier, Pocono, and Devonian, as classified in the above table, from the western portions of the State eastward into Wyoming and McDowell. The following record of a test well on Tug Fork, 10 miles westward from the McDowell-Mingo County Line, a partial record of which is given on page 87 of the Logan-Mingo Report, exhibits a fair thickness of the Maxton, Big Injun and Berea Sands, as also of the Big Lime. Hence it is that these zones are represented in the territory of this Report:

Jackson Mounts No. 1 Well Record.

In the State of Kentucky, on Poplar Creek, $\frac{1}{2}$ mile southwest of Cedar, Mingo County, West Virginia; drilled by the Poplar Creek Oil Co., and completed November 22, 1913; authority, H. C. Duncan, Jr., Huntington, W. Va.

	Thickness Feet.	Total Feet.	
Kanawha Group (138')			
Gravel, brown (10" casing, 35').....	35	35	
Sandstone, white, Upper Gilbert, hole full of water at 40'.....	8	43	
Coal 3' }			
Sandstone, white.....16 }			
Coal 5 }			
Sandstone, white, Lower Gilbert.....	65	132	
Coal, Gilbert.....	6	138	138'
New River and Pocahontas Groups (1352')			
Sandstone (3" casing, 420').....	362	500	
Slate, black	40	540	
Sandstone, gray	150	690	
Slate, black (Sewell Coal horizon?).....	6	696	
Sandstone, white (gas show at 960').....	404	1100	
Slate, black	30	1130	
Sandstone, white.....	360	1490	1352'
Mauch Chunk Series (510')			
Red rock	110	1600	
Lime, gray	30	1630	
Slate, black	70	1700	

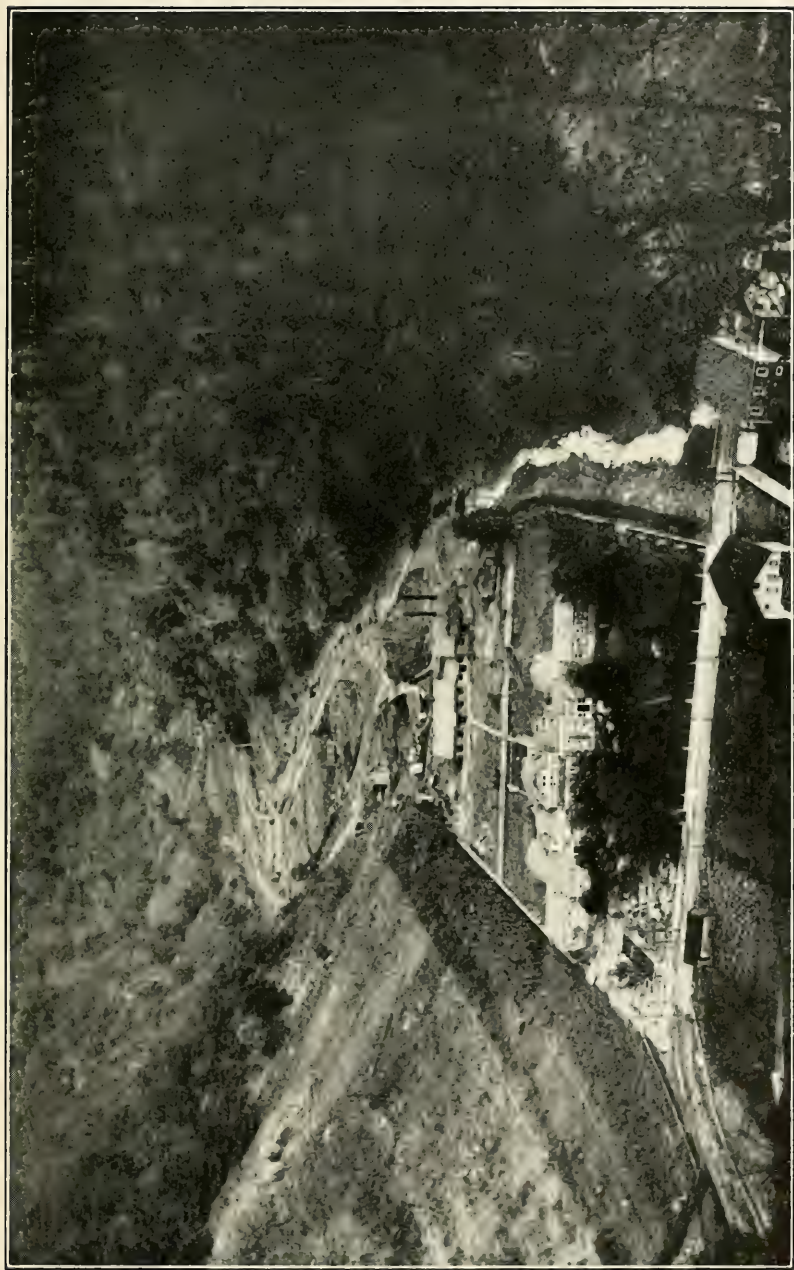


PLATE XIII—Showing Miners Hospital No. 1 and grounds at the northwest edge of Welch on Brown's Creek, looking northeast up the latter stream.

	Thickness Feet.	Total Feet.	
Sandstone, white, Maxton (Princeton Conglomerate?)	180	1880	
Slate, black	30	1910	
Sandstone, white	35	1945	
Slate, black	45	1990	
Pencil, black (6" casing, 2000')	10	2000	510'
Greenbrier Limestone (335')			
Little Lime, black..... 75' }			
Big Lime, white (gas shows, at 2205' & 2295')..... 260 }	335	2335	335'
Pocono Sandstones (632')			
Sand, Big Injun, gray.....	80	2415	
Slate and shells, white.....	476	2891	
Shale, brown	60	2951	
Sand, Berea	11	2962	627'
Slate, black, to bottom.....	5	2967	5'

The well mouth in the above record is 60 feet by hand-level, as determined by the writer, below the crop of the undoubted Lower War Eagle Coal, so that the correlations of the coals recorded in the log are correct. The thickness of the veins, however, is no doubt excessive, as the boring was made by the usual churn-drill method prevailing in oil and gas operations. Crop exposures of the same beds immediately southeastward show these much thinner.

The next nearest test well is at Clothier, Logan County, about 12 miles northwest of the Wyoming-Logan County Line, the detailed record of which is published in connection with the Clothier-Beech Creek Section, pages 50-54 of the Logan-Mingo County Report. A fair thickness of the Maxton, Big Lime, Big Injun and Berea is given in the log of this boring, along with a show of gas in the top of the latter sand.

From the foregoing data near Cedar, Mingo County, and the columnar section by Campbell¹ of the Mississippian division of the Carboniferous in the vicinity of Pocahontas, Virginia, the writer has compiled the following table, giving not only an estimate of the interval in feet of each of these sands below the horizon of the Sewell Coal at these two widely separated points, but also the rate of increase of these intervals to the southeastward, expressed in feet to the mile, based on an air line distance of about 37½ miles from Cedar to a northeast-southwest line through Pocahontas:

¹M. R. Campbell, Pocahontas Folio, No. 26, U. S. G. Survey; 1895.

Sands.	Cedar, Mingo County.	Pocahontas, Virginia.	Rate of Increase Feet per Mile.
Maxton, (Princeton Con- glomerate?)	1000	2000	30
Big Lime	1300	4600	90
Big Injun	1635	6100	120
Berea	2250	6700	120

In that portion of each County where the contours are based on the No. 3 Pocahontas Coal, the interval up to the Sewell bed can be readily approximated from the data given in the two tables in Chapter III, pages 35 and 36. In order to make a rough estimate of the intervals below the Sewell Coal that these sands might be encountered at several places, the air line distance in miles of each point northwestward from a northeast-southwest line through Pocahontas was determined on Map II, and this result, multiplied by the rate per mile increase expressed in the above table, and that subtracted from the intervals of each at Pocahontas, give the approximate number of feet each belongs below the Sewell Coal at the points designated in the table below, arranged roughly from northwest to southeast across each County. The results indicate in a striking manner the rapid northwest thinning of the strata in this region, and that the Big Injun and Berea lie below the average depths—3000 to 3600 feet—generally drilled for the deeper Devonian sands in the northwestern counties of the State, over a considerable portion of southeast Wyoming and McDowell:

Approximate Intervals below the Sewell ("Davy") Coal.

Location.	Sands.			
	Maxton.	Big Lime.	Big Injun.	Berea.
(Wyoming County)				
	Feet.	Feet.	Feet.	Feet.
Campus	1000	1500	1900	2500
Oceana	1100	1900	2500	3100
McGraw	1200	2300	3000	3600
Simon	1100	1900	2500	3100
Baileysville	1200	2300	3000	3600
Pineville	1300	2600	3400	4000
Mullens	1500	3200	4200	4800
Herndon	1700	3600	4800	5400
Clarks Gap	1800	4000	5300	5900
(McDowell County)				
Mohawk	1100	1800	2400	3000
Jaeger	1200	2300	3000	3600
Davy	1400	2700	3600	4200
Welch	1500	3100	4100	4700
Keystone	1700	3700	4900	5500
Coaldale	1900	4300	5700	6300
Bradshaw	1400	2800	3700	4300
Berwind	1700	3900	5000	5600
Squire Jim	1800	4100	5500	6100
Gary	1700	3700	4900	5500

If this northwest thinning of the rocks is at all uniform, as has been assumed between Pocahontas and Cedar, in compiling the data in the table above, it is very evident that it will require deep drilling to penetrate to the Big Injun and Berea Sands. It is a known fact that the rate of thinning of that portion of the column represented by the Pocahontas Group is greater in the southeast portion of the area than in the northwest, but this does not appear to be true for the New River and Kanawha Groups, and, as mentioned on a preceding page of this Chapter, there is no information from well borings obtainable on the rate for the Mauch Chunk, Greenbrier Limestone and Pocono Sandstones, the latter being represented by the Big Injun and Berea. The above table has been prepared merely as a rough guide to the operator in the absence of any well records, and it is believed that in most cases the results will not vary over 100 to 500 feet either way from the true intervals. One mile northwest of Squire Jim, McDowell County, the Sewell Coal belongs about 1600 feet above drainage; hence, a boring sunk near the intersection of the Dry

Fork Anticline with Big Creek, according to the above table, should encounter the Maxton at a depth of about 100 feet; the Big Lime, at 2400 feet; the Big Injun, at 3800 feet; and the Berea, at 4400 feet.

PROSPECTIVE OIL AND GAS AREAS.

A brief discussion will now be given of the possibilities of finding oil and gas in commercial quantities in each County by magisterial districts, ever keeping in mind that Wyoming and McDowell lie 25 miles southeastward from the main developed petroleum and natural gas belt in West Virginia, in a region where the folding, with its consequent increased metamorphic action, has become more intense, the latter feature being strikingly shown by the low volatile content of the coal beds. The fact that these coals have lost a large portion of their volatile gases by metamorphism since deposition, tends to the probability that the valuable hydrocarbons—petroleum and natural gas—may have escaped from the lower rocks as a direct result of the same action. Again, it is possible that the conditions leading to their genesis may not have prevailed in this far removed portion of the State, so that the remarks given on subsequent pages of this Chapter are influenced mostly by the structural features, as described in detail in Chapter III; the assumption that the Maxton, Big Lime, Big Injun and Berea zones are persistent; and the possibilities of others developing.

Wyoming County.

Oceana, Clear Fork and Huff Creek Districts.

A glance at the structure contours on Map II shows that the entire area of Oceana, Clear Fork and Huff Creek Districts lies on the long and fairly rapid pitching northwest slope of the Pineville Anticline, at a very high structural level, if referred to the axis of the Coalburg Basin, 2 miles southeast of Logan, Logan County, 12 to 15 miles northwestward. Keeping in mind the remarks on preceding pages of this Chapter, this is a favorable condition for gas, but, for reasons already

cited, any venture to test the underlying sands would be attended with great financial risk. If any are undertaken, they should be confined first to the southeast margins of the Districts, in order to get closer the crest of the anticline last mentioned. In the event a pool should be opened, then the value of the structure map assumes great importance in aiding its further development. In the southern point of Clear Fork District, the general uniform northwest dip of the upper strata is apparently interrupted by a slight structural terrace as exhibited on Map II by the wide divergence of the 500 and the 550-foot contours of the Sewell Coal northeastward from Big Branch. Should this affect in the same way the deeper rocks of the Mississippian, which hold the four possible zones—Maxton, Big Lime, Big Injun and Berea—then the region between Simon and the last mentioned stream is favorably located for oil. The table given on a preceding page of this Chapter shows the top of the Big Lime belonging at approximately 1900 feet below the horizon of the Sewell Coal at Simon. Map II shows the latter seam at 600 feet below the bed of Guyandot; hence, the Big Lime probably belongs about 2500 feet below the same stream.

Baileysville District.

Baileysville District (Wyoming) lies slightly higher up the structural slope than those last described, and a glance at Map II shows that its southeast corner is traversed in a northeast-southwest direction by the axis of the Pineville Anticline which has subsided to the southwest into a very low fold or monoclinical interruption of the general northwest dip of the strata. This feature makes that portion of the District lying immediately along the crest of this arch appear favorable for either oil or gas, subject, of course, to the doubtful conditions mentioned on a preceding page as accompanying these two Counties. Here the top of the Big Lime probably does not belong over 2400 feet below the bed of Indian Creek at the mouth of Jud Branch. Westward in this District, the dip of the strata is fairly uniform, with no special structural feature to attract the operator. If, however, a gas pool should be

opened, as mentioned above, in the southeastern corner, then, the logical portion of the District to search for oil in the same zone is northwestward down the structural slope.

Slab Fork and Center Districts.

Slab Fork and Center Districts, lying in the northeast portion of Wyoming County, are traversed in a northeast-southwest direction by four structural folds; viz, the Pineville and Mullens Anticlines and the Pineville and Mullens Synclines, as will readily be observed on Map II, all of which have been described in Chapter III, pages 38, 39 and 43, respectively. Both the arches are low monoclinal interruptions in the long northwest slope of the Abbs Valley Anticline of Campbell², and they create ideal conditions from a purely structural standpoint for the accumulation of oil and gas into rich pools, the area along the crest of the anticlines being favorable for the former; and that, close down along the axes of the synclines, for the latter, if the zones are non-water bearing. The same structural conditions, if present in the northwest Counties of the State, would almost certainly be accompanied by prolific pools. For reasons already given, however, the financial risk in the deep drilling required in this region to penetrate the Big Lime, Big Injun and Berea would be great, since the top of the Big Injun belongs, according to the table on a preceding page, 3150 feet below Laurel Fork at McGraw; 3050 feet below the Guyandot River at Pineville; and 1900 feet below the same stream at Mullens.

Barkers Ridge District.

Barkers Ridge District, occupying the southeastern portion of Wyoming County, at a higher structural level than any heretofore described, is traversed in a northeast-southwest direction by the same folds as mentioned above for Slab Fork and Center, the Pineville Anticline and the Syncline of the same name just intersecting its extreme western point. The remarks, concerning the oil and gas prospects in the two

²M. R. Campbell, Pocahontas Folio, No. 26, U. S. G. Survey; 1895.

Districts last described, apply with equal force and with the same limitations in Barkers Ridge. However, in the latter, the wide structural terrace as outlined on Map II by the 1450-foot level of the No. 3 Pocahontas Coal, southwestward from Guyandot River and Barkers Creek, caused by the flattening down of the Mullens Anticline southwestward from the former stream, is even more favorable from a purely structural standpoint for segregating a large commercial oil pool, than the conditions associated with the folds in Center and Slab Fork Districts. Along the southeastern edge of this area, in the vicinity of Clarks Gap and northeastward from the latter place to the extreme eastern point of Wyoming County, there is a marked flattening of the dip on the west slope of the Abbs Valley Anticline. This terrace is also favorable for oil and gas, considered on structural grounds only. An examination of the table of intervals on a preceding page of this Chapter shows that it would require very deep drilling in this region to penetrate the rocks to the top of the Big Injun Sand.

McDowell County.

Sandy River District.

Sandy River District, occupying the western third of McDowell County, lies entirely on the western slope of the Dry Fork Anticline, the only apparent interruption of the generally uniform northwest dip of its strata, being the structural terrace in the vicinity of Bradshaw, as outlined on Map II by the divergence of the 1200 and the 1300-foot contours of the Sewell Coal, southwestward from Dry Fork to near the State Line. Considered only from a structural standpoint, the latter region is specially favored for oil in commercial quantities, subject, of course, to the same limitations and doubts as to its genesis as mentioned on preceding pages of this Chapter, in this mountainous portion of the State. By reference to the table on a preceding page and Map II, it is determined that the Big Injun Sand is approximately 3600 feet below the bed of Dry Fork at Bradshaw, and the Berea, about 600 feet deeper; hence, drilling to these zones here would be an expen-

sive process. Of course, the great expansion of the Mauch Chunk may have developed several other zones in these Measures than the Maxton Sand, so that oil, if present, might be encountered at much more shallow depths.

Browns Creek District.

Browns Creek District, lying in the north central edge of McDowell County, is situated on the western slope of the Dry Fork Anticline as may be observed on Map II. The general northwest dip of its strata is flattened somewhat northward from Davy and northeastward from Welch by the dying out to the southwest of the Pineville and Mullens Anticlines, respectively. The resulting terraces are favorable localities for the segregation of oil into commercial pools, if any exist in the underlying rocks of the District. A test well on Left Fork of Davy Branch, one mile due north of the mouth of the latter, should reach the top of the Big Lime approximately 2500 feet below the bed of Left Fork; and, another, on Browns Creek, $\frac{1}{2}$ mile east of the mouth of Puncheoncamp Branch, should reach the top of the same zone at approximately 2700 feet below the former stream, according to the figures given in the table of intervals on a preceding page of this Chapter. For reasons already given, the financial risk in drilling even on these benches would be great.

Big Creek District.

Big Creek District, occupying the southern central edge of McDowell County, is traversed by three structural folds; viz, the Bradshaw and Dry Fork Anticlines, and the Bradshaw Syncline, all of which have been described in Chapter III, pages 40, 41 and 44, respectively. For purely structural reasons, that territory lying immediately along the crest of the anticlines in this District, is favorable for gas; and that, westward from Yukon, along the axis of the syncline to the Big Creek-Sandy River District Line, for oil. Here, again, the same limitations and doubts are encountered as described above for prospective areas in other Districts of McDowell.

as also in Wyoming County. From the data given on preceding pages of this Chapter, the oil and gas operator can determine approximately the depth that the Big Lime and other zones might be encountered, at any point, should a decision be made to test any of these belts or areas in Big Creek District.

Adkin District.

Adkin District, lying immediately northeast of that last described, in the southeast edge of McDowell, is traversed in an almost east and west direction by the great Dry Fork Anticline; and that region along the crest of this fold, for a width of 2 to 3 miles, is ideally located, mainly from a structural standpoint, for the segregation of a rich gas pool. The existence of the latter, however, is problematical as discussed on preceding pages of this Chapter. A test well near the mouth of Jump Branch of South Fork should encounter the Maxton at a depth of approximately 100 feet; the Big Lime, at 2400 feet; the Big Injun, at 3800 feet; and the Berea, at 4400 feet, as determined from the results given in the table of intervals, page 251.

North Fork and Elkhorn Districts.

North Fork and Elkhorn Districts, occupying the eastern point of McDowell County, lie entirely on the western slope of the Abbs Valley and Dry Fork Anticlines. The structural terrace, mentioned for the Clarks Gap region, on a preceding page of this Chapter under the description of the prospects in Barkers Ridge District, Wyoming County, extends southwestward along their southeast edges, being almost bisected by the Mercer-McDowell County Line, and the remarks as to the oil and gas prospects on this bench in the structural slope in the last named District, apply with equal force for North Fork and Elkhorn, as also the immediately adjoining portion of Mercer County.

CHAPTER X.

COAL.

A brief description of all the coal beds that were observed in the two Counties, as also their correlation and in many cases type sections, has been given in Chapters V, VI, and VII, along with references to the general and special sections of the measures and the logs of coal test borings in which the seams were recorded. The thin and unimportant beds were discussed quite fully. In this Chapter, the production, thickness, character, composition, approximate minable area and available tonnage of those coals which are of sufficient thickness, purity and regularity to warrant commercial mining operations on them either at present or in the near future, are described.

STATISTICS OF COAL PRODUCTION.

Coal mining operations on a commercial basis in Wyoming and McDowell Counties have been carried on in seven different beds; viz, Eagle ("Middle War Eagle"), Douglas, Sewell ("Davy"), Welch, and Beckley ("War Creek") in the New River beds; and Nos. 4 and 3 Pocahontas, in the Pocahontas Group. The following table, with the coals arranged in descending order, shows the relative importance of the beds when considered from the standpoint of the number of separate mining operations on each:

Number of Mines by Coal Beds.

Coal Bed.	No. of Mines.
Eagle ("Middle War Eagle").....	3
Douglas	2
Sewell ("Davy")	21
Welch	18
Beckley ("War Creek").....	13
No. 4 Pocahontas	16
No. 3 Pocahontas	63
Total	136

With the exception of less than a dozen shaft operations, all these 136 mines are either by drift or slope, owing to the abundance of coal above drainage.

The following tables are compiled from the Annual Report of Hon. Earl A. Henry, Chief of the Department of Mines, West Virginia, for the year ending June 30, 1913:

**Coal Production of Wyoming and McDowell Counties from
1888 to 1913, Inclusive.**

Year.	Tons of 2240 Lbs.	Year.	Tons of 2240 Lbs.	
	McDowell.		Wyoming.	McDowell.
1888 .....	.....	1902 .....	.....	4,734,199
1889	245,760	1903 .....	.....	5,249,913
1890	504,222	1904 .....	.....	5,524,376
1891	704,871	1905 .....	.....	6,810,730
1892	1,100,882	1906 .....	.....	7,806,524
1893	1,876,838	1907 .....	.....	8,123,699
1894	2,340,581	1908	652	8,515,689
1895	2,440,551	1909 .....	.....	9,415,069
1896	2,836,013	1910 .....	.....	12,189,200
1897	2,617,917	1911 .....	.....	11,945,763
1898	3,183,529	1912 .....	.....	13,768,077
1899	3,516,668	1913	1,650	14,913,342
1900	4,142,162			
1901	4,219,251			
		Totals	2,302.....	138,725,766

**Production of Coal and Coke by Mines, Wyoming County,
for the Year Ending June 30th, 1913.**

Name of Company—Mead-Pocahontas Coal Co.
 Name of Mine—Mead-Pocahontas.
 Production of Coal for Year—1,650 Tons of 2,240 lbs.
 Furnished Local Trade and Tenants—240 Tons.
 Quantity Shipped from Mine—1,410 Tons.
 Located on Virginian Railway.

Order of the Production of Coal by Counties, 1897-1913.

Counties.	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
Fayette	1	1	1	1	1	1	2	1	2	2	2	2	2	2	2	2	2
McDowell	2	2	2	2	2	2	1	2	1	1	1	1	1	1	1	1	1
Marion	3	3	3	3	3	3	3	4	3	4	4	4	4	4	4	4	3
Kanawha	4	4	4	4	4	4	5	3	3	3	3	3	3	3	3	3	7
Mercer	5	5	5	6	6	6	6	6	6	6	6	6	6	7	8	8	8
Harrison	9	9	8	7	5	5	4	5	5	5	5	5	5	5	5	6	4
Tucker	6	6	7	5	7	7	7	8	8	8	10	10	10	10	10	10	10
Mingo	8	8	9	9	9	8	8	7	7	7	7	7	9	9	9	9	9
Mineral	7	7	6	8	8	9	11	11	12	13	14	13	11	13	15	17	16
Preston	13	11	10	10	10	10	9	10	10	9	9	11	13	11	11	11	11
Taylor	10	10	11	11	11	11	14	16	16	16	17	17	16	15	14	13	13
Marshall	11	12	12	12	13	16	13	14	14	15	15	18	19	16	18	16	15
Rando'ph .....	.....	.....	14	14	14	14	12	13	13	12	13	14	14	14	13	14	14
Barbour	19	19	17	18	12	12	10	9	11	11	11	12	12	12	12	12	12
Ra'eigh	16	16	16	19	17	13	15	12	9	10	8	8	6	6	5	5	5
Putnam	12	13	13	13	15	15	16	15	15	14	18	16	17	17	17	18	18
Ohio	15	15	14	15	16	17	18	19	21	22	21	21	21	20	20	20	20
Brooke	17	18	18	20	20	20	23	22	17	17	16	15	15	18	16	15	17
Mason	14	14	15	16	18	19	19	20	22	21	22	22	22	22	22	25	25
Grant .....	.....	.....	.....	.....	.....	.....	22	18	19	19	20	20	20	21	21	23	24
Logan .....	.....	.....	.....	.....	.....	.....	.....	.....	20	18	12	9	7	8	7	7	6
Monongalia	20	17	19	17	19	18	17	17	18	20	19	19	18	19	19	19	19
Hancock	18	20	20	21	21	21	20	21	24	24	23	25	26	24	27	.....	.....
Clay .....	.....	.....	.....	.....	.....	.....	.....	25	23	23	24	27	30	30	25	24	22
Nicholas .....	.....	.....	.....	.....	.....	22	24	24	25	25	25	26	27	26	24	29	27
Lincoln .....	.....	.....	.....	.....	.....	23	21	23	27	26	30	30	25	28	28	.....	30
Braxton .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26	23	23	23	22	23	23
Wayne .....	.....	.....	.....	.....	.....	.....	.....	.....	26	27	29	29	28	29	32	28	28
Upshur .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	27	24	24	25	29	31	29
Greenbrier .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28	28	29	32	30	32
Lewis .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31	31	32	33	33	30	31
Gilmer .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32	32	31	31	26	26
Wyoming .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33
Boone .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	34	27	21

Production of Coal and Coke by Mines, McDowell County, for the Year Ending June 30th, 1913.

NAME OF COMPANY.			NAME OF MINE.			Production of Coal. (Tons of 2,240 Lbs.)		Distribution of Coal. (Tons of 2,240 Lbs.)			Production of Coke. (Tons of 2,000 Lbs.)			Railroad Located on.		
						First Six Months	Second Six Months	Total Coal Produced During Year.	Used in Operation of Mine.	Furnished Local Trade and Tenants.	Used in Coke Ovens.	Quantity Shipped from Mines.	First Six Months.		Second Six Months.	Total Coke Produc- tion for Year.
J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	48,665	51,218	99,873	3,000	2,000		94,873				N.
J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	31,556	23,799	55,355				55,355				W.
J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	34,278	35,627	69,905		1,800		68,105				W.
J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	J. B. B. Coal Co.	61,979	64,759	126,738	3,000	4,000		119,738				W.
Superior Poca.	Coal Co.	Coal Co.	Blackstone No. 1.	Blackstone No. 1.	Blackstone No. 1.	29,653	27,642	57,295				57,295				W.
Superior Poca.	Coal Co.	Coal Co.	Davy Crockett No. 2.	Davy Crockett No. 2.	Davy Crockett No. 2.	24,536	23,002	47,538				47,538				W.
Superior Poca.	Coal Co.	Coal Co.	Helena No. 3.	Helena No. 3.	Helena No. 3.	25,736	25,446	51,182	2,400	3,600		45,182				W.
Superior Poca.	Coal Co.	Coal Co.	Cletus No. 4.	Cletus No. 4.	Cletus No. 4.	11,231	11,716	22,947				22,947				W.
Flanagan Coal Co.	Flanagan Coal Co.	Flanagan Coal Co.	Flanagan No. 1.	Flanagan No. 1.	Flanagan No. 1.	8,632	8,038	16,670		105		16,565				W.
Flanagan Coal Co.	Flanagan Coal Co.	Flanagan Coal Co.	Flanagan No. 2.	Flanagan No. 2.	Flanagan No. 2.	2,665	6,238	8,903	285			8,593				W.
Carter Coal Co.	Carter Coal Co.	Carter Coal Co.	No. 1 East & West.	No. 1 East & West.	Carter Coal Co.	41,618	23,549	65,167	3,325	999		60,843				W.
Carter Coal Co.	Carter Coal Co.	Carter Coal Co.	No. 2 East & West.	No. 2 East & West.	Carter Coal Co.	31,080	24,688	55,768	620			54,323				W.
Carter Coal Co.	Carter Coal Co.	Carter Coal Co.	Nos. 3, 4, 1½, 8 & Nora.	Nos. 3, 4, 1½, 8 & Nora.	Carter Coal Co.	28,536	19,044	47,580		1,387		46,193				W.
Carter Coal Co.	Carter Coal Co.	Carter Coal Co.	Thelma.	Thelma.	Carter Coal Co.	40,616	49,024	89,640	1,678	821		87,141				W.
Carter Coal Co.	Carter Coal Co.	Carter Coal Co.	Caretta.	Caretta.	Carter Coal Co.	45,201	40,294	85,495	1,778	726		82,991				W.
Lake Superior Coal Co.	Lake Superior Coal Co.	Lake Superior Coal Co.	No. 1.	No. 1.	Lake Superior Coal Co.	0	10,693	10,693	1,497			9,196				W.
Lake Superior Coal Co.	Lake Superior Coal Co.	Lake Superior Coal Co.	No. 2.	No. 2.	Lake Superior Coal Co.	0	13,974	13,974	531	156		13,287				W.
New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	Berwind No. 1.	Berwind No. 1.	New R. & Poca. Cons. C. Co.	55,128	54,514	109,642	10,200	300	45,836	53,366	24,400	23,460	47,860	N.
New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	Berwind No. 2.	Berwind No. 2.	New R. & Poca. Cons. C. Co.	45,489	44,269	89,758		2,985		86,773				W.
New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	Berwind No. 3.	Berwind No. 3.	New R. & Poca. Cons. C. Co.	48,408	48,906	97,312		1,560		95,752				W.
New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	Berwind No. 4.	Berwind No. 4.	New R. & Poca. Cons. C. Co.	17,826	17,567	35,394		410		34,984				W.
New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	New R. & Poca. Cons. C. Co.	Havaco.	Havaco.	New R. & Poca. Cons. C. Co.	34,009	34,416	68,416	4,000	5,600		58,816				W.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Cherokee.	Cherokee.	Poca. Cons. Coll. Co., Inc.	64,390	58,490	122,880	9,000	5,000		108,880				N.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Rolfe.	Rolfe.	Poca. Cons. Coll. Co., Inc.	93,050	88,280	181,330	3,000	6,000		172,330				W.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Lick Branch.	Lick Branch.	Poca. Cons. Coll. Co., Inc.	135,234	142,794	278,028	3,000	6,000	60,928	208,100	18,490	19,590	38,680	N.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Delta.	Delta.	Poca. Cons. Coll. Co., Inc.	125,620	133,040	258,660	3,000	47,000		198,660				W.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Shamokin.	Shamokin.	Poca. Cons. Coll. Co., Inc.	131,610	120,214	251,824	3,000	7,000	47,184	194,640	16,000	13,492	29,492	N.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Norfolk.	Norfolk.	Poca. Cons. Coll. Co., Inc.	148,366	136,942	285,308	3,000	7,000	74,128	221,180	22,910	23,420	46,330	N.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Angie.	Angie.	Poca. Cons. Coll. Co., Inc.	108,830	131,540	240,370	3,000	4,000	21,680	211,690	13,550	13,550		W.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	No. 6.	No. 6.	Poca. Cons. Coll. Co., Inc.	111,900	122,710	234,610	2,000	3,000		229,610	3,410			N.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	No. 7.	No. 7.	Poca. Cons. Coll. Co., Inc.	80,850	80,850	161,700	1,000	1,500		78,350				W.
Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	Poca. Cons. Coll. Co., Inc.	No. 8.	No. 8.	Poca. Cons. Coll. Co., Inc.	56,323	45,360	101,683	300	500		44,560				W.
Solvay Collieries Co.	Solvay Collieries Co.	Solvay Collieries Co.	Big Sandy.	Big Sandy.	Solvay Collieries Co.	56,323	56,902	113,225	1,438	983		110,804				N.
Solvay Collieries Co.	Solvay Collieries Co.	Solvay Collieries Co.	Marytown.	Marytown.	Solvay Collieries Co.	87,520	87,130	174,656	1,703	1,070		171,877				N.

Production of Coal and Coke by Mines, McDowell County, for the Year Ending June 30th, 1913.—(Continued.)

NAME OF COMPANY.		NAME OF MINE.		Production of Coal. (Tons of 2,240 Lbs.)		Distribution of Coal. (Tons of 2,240 Lbs.)		Production of Coke. (Tons of 2,000 Lbs.)		Railroad Located on.										
				Total Coal Produced During Year.		Used in Operation of Mine.		Furnished Local Trade and Tenants.			Used in Coke Ovens.		Quantity Shipped from Mines.		First Six Months.		Second Six Months.		Total Coke Produced for Year.	
Bottom Creek C. & C. Co.	Bottom Creek Ck. No. 1.	62,473	58,439	120,942	4,915	2,053	31,108	82,866	13,049	21,836	N.									
Bottom Creek C. & C. Co.	Bottom Ck. No. 2.	54,179	48,221	102,400	.....	.....	.....	102,400	.....	.....	N.								
Coal & Coke Co.	No. 2.	164,585	171,487	336,072	1,022	3,595	336,072	331,455	.....	.....	N.								
Coal & Coke Co.	No. 3.	99,240	80,974	180,214	39,046	2,136	180,214	189,032	.....	.....	N.								
Coal & Coke Co.	No. 4.	150,988	146,709	297,697	.....	1,948	297,697	295,749	.....	.....	N.								
Coal & Coke Co.	No. 5.	98,221	101,145	199,366	.....	1,478	199,366	197,888	.....	.....	N.								
Coal & Coke Co.	No. 6.	218,783	239,099	457,882	.....	945	457,882	473,150	.....	.....	N.								
Coal & Coke Co.	No. 7.	214,822	184,761	399,583	.....	2,029	399,583	373,000	.....	.....	N.								
Coal & Coke Co.	No. 8.	124,144	106,003	230,147	.....	1,487	230,147	228,660	.....	.....	N.								
Coal & Coke Co.	No. 9.	971,635	248,059	519,694	.....	3,587	519,694	516,197	.....	.....	N.								
Coal & Coke Co.	No. 10.	121,517	113,244	234,761	.....	2,133	234,761	232,628	.....	.....	N.								
Coal & Coke Co.	No. 11.	201,053	170,479	371,532	.....	2,398	371,532	369,134	.....	.....	N.								
Coal & Coke Co.	No. 12.	131,082	135,966	267,048	.....	1,602	267,048	265,446	.....	.....	N.								
Davy Poca Coal Co.	Davy Poca. No. 1.	23,410	28,055	51,465	.....	818	51,465	50,647	.....	.....	N.								
Davy Poca Coal Co.	Davy Poca. No. 2.	8,889	10,004	18,893	1,565	.....	18,893	17,328	.....	.....	N.								
Poca Smokeless Coal Co.	Poca. Smokeless.	24,000	20,000	44,000	.....	2,500	44,000	41,500	.....	.....	N.								
War Eagle Coal Co.	Memphisto & Pappoose.	35,013	28,860	63,873	7,200	1,000	63,873	55,673	.....	.....	N.								
Crozer C. & C. Co.	Nos. 1 & 2.	172,561	180,783	353,344	7,109	1,923	353,344	347,235	.....	.....	N.								
Pulaski Iron Co.	Nos. 1, 2 & 3.	192,096	167,329	359,425	2,000	1,600	359,425	352,803	.....	.....	N.								
Middle States C. & C. Co.	Helena.	115,000	95,000	210,000	10,000	800	210,000	207,803	.....	.....	N.								
Shawnee C. & C. Co.	Shawnee.	78,783	70,877	149,660	1,200	1,200	149,660	151,200	.....	.....	N.								
W. Va. Poca Coal Co.	Leckie Nos. 1 & 2.	83,882	104,594	188,476	.....	872	188,476	187,604	.....	.....	N.								
Tidewater C. & C. Co.	Tidewater.	70,890	67,792	138,683	8,147	535	138,683	130,001	.....	.....	N.								
Powhatan C. & C. Co.	Powhatan.	121,810	107,698	229,508	8,400	2,000	229,508	227,725	.....	.....	N.								
Houston C. & C. Co.	Houston 1 & 2.	294,362	172,891	467,253	5,000	1,500	467,253	463,845	.....	.....	N.								
Pace C. & C. Co.	Nos. 1, 2 & 3.	173,292	163,896	337,188	7,200	1,800	337,188	333,931	.....	.....	N.								
Arlington C. & C. Co.	Arlington.	55,008	48,853	103,861	4,500	589	103,861	98,585	.....	.....	N.								
Gilliam C. & C. Co.	Gilliam.	37,771	65,729	103,500	700	643	103,500	102,510	.....	.....	N.								
Algoma C. & C. Co.	North Fork & Pincy.	115,501	106,113	221,614	3,600	1,000	221,614	218,444	.....	.....	N.								
Ashtand C. & C. Co.	Ashtand & Monitor.	123,683	109,251	232,934	7,000	675	232,934	229,705	.....	.....	N.								
McDowell C. & C. Co.	McDowell.	134,260	118,763	253,023	10,000	7,780	253,023	246,360	.....	.....	N.								
War Creek Coal Co.	No. 1.	5,747	3,180	8,927	200	200	8,927	8,527	.....	.....	N.								
Keystone C. & C. Co.	Nos. 1 & 2.	192,230	124,200	246,430	5,000	1,800	246,430	240,400	.....	.....	N.								
Lynchburg C. & C. Co.	Lynchburg.	132,393	124,575	246,968	10,000	4,000	246,968	243,957	.....	.....	N.								
Eureka C. & C. Co.	Eureka.	111,492	94,107	205,599	3,000	2,000	205,599	203,511	.....	.....	N.								
Cirrus C. & C. Co.	Cirrus No. 2.	55,445	44,340	99,785	6,000	4,000	99,785	98,785	.....	.....	N.								

Production of Coal and Coke by Mines, McDowell County, for the Year Ending June 30th, 1913.—(Continued.)

NAME OF COMPANY.	NAME OF MINE.	Production of Coal. (Tons of 2,240 Lbs.)			Distribution of Coal. (Tons of 2,240 Lbs.)			Production of Coke. (Tons of 2,000 Lbs.)		
		Total Coal Produced			Used in Operation			Quantity Shipped from Mines.		
		First Six Months	Second Six Months		Used in Operation	Furnished Local Trade and Tenants.	Used in Coke Ovens.	First Six Months.	Second Six Months.	Total Coke Produced for Year.
Empire C. & C. Co.	Empire.	133,054	116,068	249,122	2,715	537	46,951	198,919	18,348	32,851
Turkey Gap C. & C. Co.	Turkey Gap.	114,216	75,065	189,281	4,500	750	38,689	145,442	12,193	24,119
Standard Poca. Coal Co.	Standard Poca.	21,885	26,892	48,777	2,000	1,600		45,177		
Mohawk C. & C. Co.	Mohawk.	55,822	51,972	110,794	3,000	400		107,394		
Columbus Poca. Coal Co.	Columbus Poca.	6,160	6,160	12,320	280			12,320		
Poca. Domestic Coal Co.	Scorpion.	20,548	15,247	35,795	450	120		35,225		
Oregon Coal Co.	Nos. 2, 3 & 4.	38,635	37,744	76,379	2,461	900		73,018		
Flat Top Coal Mining Co.	Thomas.	11,259	15,579	26,838	600	200		26,038		
Black Wolf C. & C. Co.	Black Wolf.	26,740	32,073	58,813				58,813		
Hemphill Colliery Co.	Hemphill	19,040	19,090	38,080				37,730		
Welch C. & C. Co.	Welch.	27,040	27,041	54,081	1,270	830		51,981		
Premier Poca. Coll. Co.	Premier Nos. 1, 2, 3 & 4.	116,572	141,963	258,535	1,984	1,800		254,751		
Vaughn C. & C. Co.	Vaughn No. 1.	9,000	3,000	12,000		120		11,880		
Henrietta Poca C. Co.	Henrietta.	7,199	6,840	14,039	150	150		13,739		
New Poca. Coal Co.	Pando.	1,874	14,398	16,272	720	240		15,312		
Yukon Poca. Coal Co.	Nos. 1 & 2.	35,268	34,706	69,974	1,500	300		68,174		
Johns Branch Coal Co.	Johns Branch.	13,845	11,573	25,418	300	300		24,818		
Excelsior Poca. Coal Co.	Excelsior.	42,520	60,449	102,969	725	365		101,879		
Greenbrier C. & C. Co.	Greenbrier.	74,464	74,746	149,210	3,366	1,108	33,029	111,707	10,374	22,419
Central West Coal Co.	Central West Poca.	3,000	2,300	5,300	100			5,200		
Elkhorn C. & C. Co.	Elkhorn.	78,238	85,654	163,937	2,453	1,181	30,360	129,943	7,001	14,622
King Coal Co.	King.	96,503	111,077	207,582	8,750	1,000		197,832		
Peerless C. & C. Co.	Peerless.	109,085	112,035	222,120	2,400	2,100	37,333	180,287	12,832	23,334
Kimball-Poca. Coal Co.	Peerless.	3,847	9,187	13,034	2,900	200		10,634		
Dry Fork Colliery Co.	Dry Fork.	47,180	49,200	96,470	1,100	300		95,070		
Lathrop Coal Co.	Panther.	55,069	71,185	126,254	1,800	600		123,854		
Ruchanan Coal Co.	Buchanan.	6,372	5,359	11,731	305	250		11,176		
Central Poca. C. & C. Co.	No. 2.	19,000	13,600	32,600		118		32,482		
Roanoke C. & C. Co.	Roanoke.	74,337	74,337	148,286	1,800	289	31,152	115,045	10,222	21,784
Upland C. & C. Co.	Upland.	162,451	160,791	323,242	10,726	1,768	52,452	258,296	16,082	32,163
Zenith C. & C. Co.	Zenith 1 & 2.	64,447	70,715	135,162		284		134,878		
Elk Ridge C. & C. Co.	Elk Ridge.	78,894	77,844	156,738	3,750	1,500	32,083	119,405	8,764	20,096
Fortune Hunter C. & C. Co.	Fortune Hunter.	2,657	6,293	8,980				8,980		
Indian Ridge C. & C. Co.	Indian Ridge.	57,828	61,234	119,062	630	259	15,136	103,037	10,407	10,407
Totals.		7,517,061	7,396,281	14,913,342	276,544	199,137	1,505,308	12,932,353	465,288	984,312

Railroad Located on.

In the territory of this Report, there are 33 minable coal seams, all cropping, in addition to 30 other beds that are too thin, impure and irregular to be so classed. These are all exhibited in descending order on Figures 3 and 4, the minable coals being represented by the heavily shaded lines, and the maximum intervals between them expressed in feet. Figure 3 shows those of the Allegheny Series and Kanawha Group, and Figure 4, those of the New River and Pocahontas Groups.

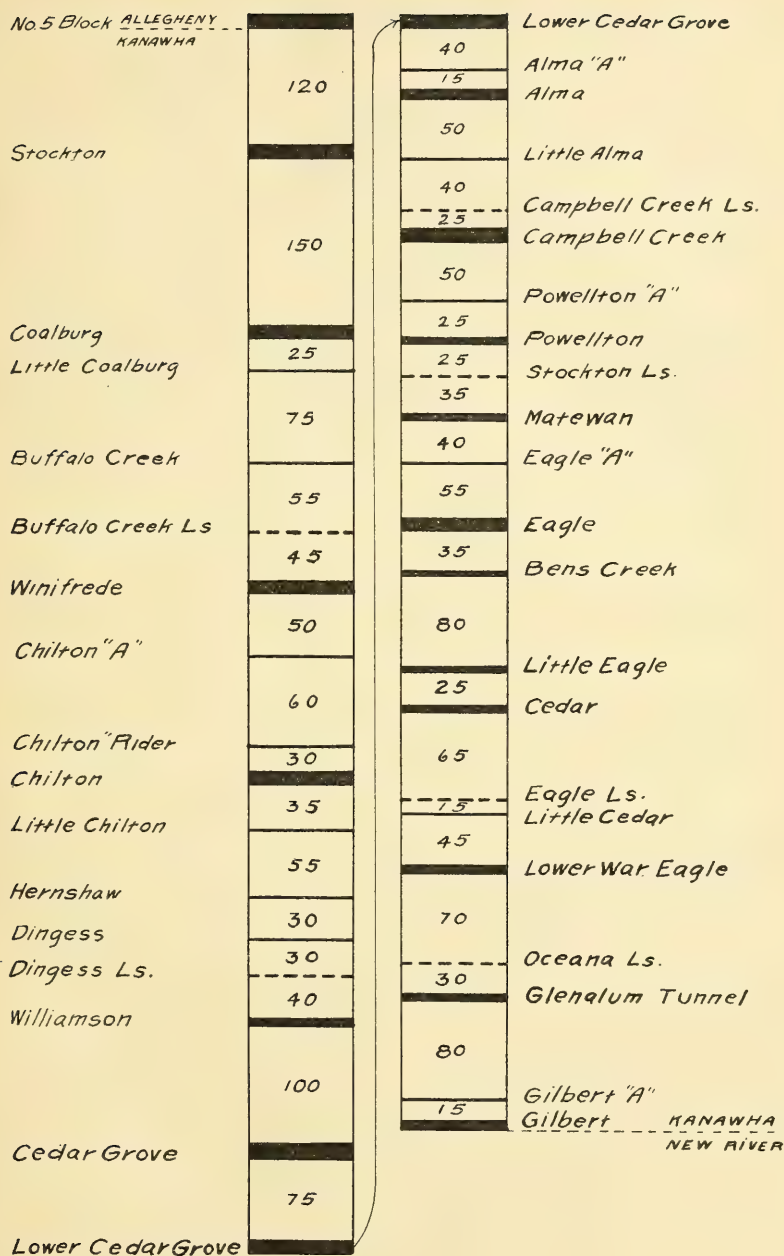


Figure 3 — Showing intervals in feet between Coal Seams of the Wyoming-McDowell Area. Kanawha Series.

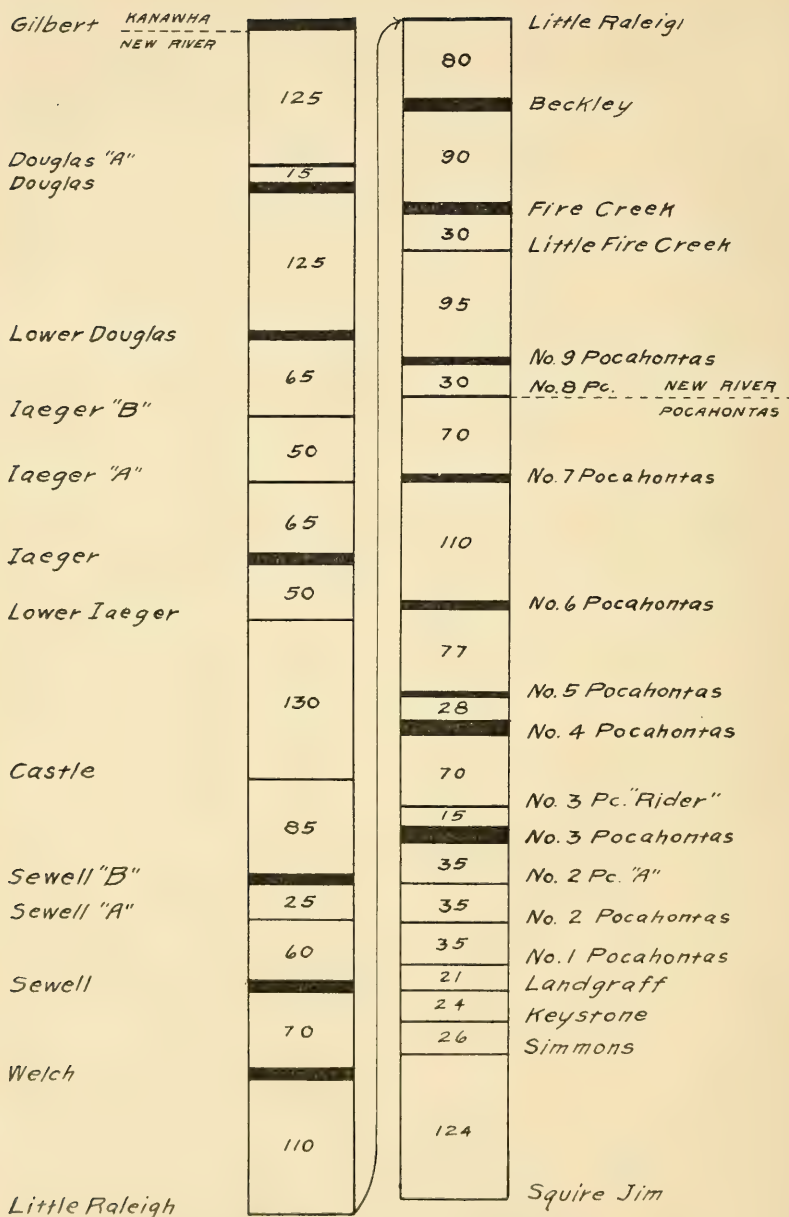


Figure 4 — Showing intervals in feet between Coal Seams of the Wyoming-McDowell Area New River and Pocahontas Series.

**RECORDS OF COAL TEST BORINGS IN
WYOMING COUNTY.*****Summarized Records.***

The coal borings in Wyoming are confined almost entirely to the southeast half of the County, 30 diamond drill tests having been sunk in this region. All these were visited by either the writer or Mr. Gawthrop during 1914 in order to determine their locations and elevations, and also to ascertain the geological horizon at which they started for correlation purposes in regard to the coals and other strata penetrated. The accompanying table contains the summarized records of nearly all these tests, as also one—No. 13 on Map II—just across the Raleigh County Line, near Hotchkiss. The first column gives the reference or serial number of the boring which appears on Map II, along with a circular symbol in black for its location. In the column under "Elevation," "A.T." signifies "Above Tide", referring to sea level; the letter "B" indicates that the elevation was determined by aneroid barometer, checked on the nearest U. S. G. Survey spirit-level bench mark; and the letter "L," a determination by hand or spirit-level. Under the column headed "Company", the following abbreviations are used:

J. B. B. C. Co. Jewett, Bigelow and Brooks Coal Company.
U. S. C. & C. Co. United States Coal & Coke Company
Va. Ry. Co. Virginian Railway Company.
W. P. C. & L. Co. Western Pocahontas Coal & Lumber Co.

Absence of Borings in Clear Fork and Huff Creek Districts.

No diamond drill borings have ever been sunk to test the coals below drainage in Clear Fork and Huff Creek Districts, (Wyoming); hence, in the absence of even churn drill tests for oil and gas, the information is very meager on which to base the continuity of the beds of the New River and Pocahontas Groups. In the latter area, however, the Douglas Coal, belonging near the top of the former division of the rock column, is exposed at crop over a large portion of the District.

Detailed Record in Oceana District.

In Oceana District (Wyoming), practically the same condition, as regards coal tests, prevails as in those last described, the only exception being the following record of a diamond drill boring, sunk in the eastern edge of the District:

Coal Test Boring (No. 1 on Map II).

Oceana District, on north side of Laurel Fork, at mouth of Hurricane Branch, 1.6 miles northeast of Jesse; well No. 6 by Western Pocahontas Coal and Lumber Co.; authority, E. M. Merrill, Beckley, W. Va.; elevation, 1369.6' L.

	Thickness Feet.	Total Feet.
Surface	16.0	16.0
Blue shale.....	12.0	28.0
Fire clay.....	1.0	29.0
Sandstone	4.0	33.0
Slate	4.0	37.0
Hard sandstone.....26.2'	Guyandot..	135.9
Sandstone, shale partings.. 1.2		
Hard sandstone..... 1.7		
Sandstone, shale partings.. 1.2		
Sandstone, very hard.....83.2		
Sandstone, sha'e partings.. 0.7		
Sandstone, very hard.....18.9		
Sandstone	2.8	172.9
Blue shale.....	1.9	
Sandstone	2.3	174.8
Blue shale.....	2.9	177.1
Sand shale.....	2.9	180.0
Sandstone, shale partings.....	8.9	188.9
Hard sandstone, Lower Guyandot.....	2.0	190.9
Sandstone, coal partings (Sewell), (1144.6' L.)	33.3	224.2
Hard sandstone, Welch.....	0.8	225.0
Sandstone, shale partings.....	15.7	240.7
	8.1	246.8

52.1'

	Thickness	Total	
	Feet.	Feet.	
Sandstone	9.1	255.9	
Shale, sandstone.....	0.8	256.7	
Sandstone .....10.3' }			
Sandstone, shale..... 0.6 }			
Sandstone .....36.2 }			
Sandstone, shale partings.. 1.0 }	Upper		
Sandstone 7.0 }	Raleigh...	73.9	330.6
Shale, sandstone partings.. 1.6 }			
Sandstone 4.6 }			
Sandstone, shale partings.12.6 }			
Sandstone, very hard.....	18.7	349.3	
Blue shale.....	9.5	358.8	
Sandstone	3.7	362.5	
Blue shale.....	7.3	369.8	
Coal, (Little Raleigh), (999.3' L.)	0.5	370.3	145.3'
Sand shale.....	1.4	371.7	
Sandstone (very hard), shale partings,			
Lower Raleigh	35.8	407.5	
Sand shale.....	11.5	419.0	
Sand slate.....	3.3	422.3	
Coal .....2' 0" }			
Fire clay.....3 7 }			
Slate .....0 5 }	(Beckley)...	6.2	428.5
Coal .....0 2 }	(941.1' L.)		58.2'
Blue shale.....	2.5	431.0	
Sandstone	8.8	439.8	
Sandstone, shale partings.....	6.2	446.0	
Sandstone, very hard.....	1.0	447.0	
Dark shale.....	4.2	451.2	
Fire clay.....	4.7	455.9	
Sandstone, shale partings.....	2.4	458.3	
Sandstone	1.6	459.9	
Bone	0.4	460.3	
Coal, (Fire Creek), (908.7' L.)	0.6	460.9	32.4'
Slate	1.3	462.2	
Sand shale.....	4.2	466.4	
Hard sandstone, Quinnimont	29.8	496.2	
Dark shale.....	3.7	499.9	
Sandstone	32.9	532.8	
Fire clay.....	2.2	535.0	
Sandstone	14.3	549.3	
Sandstone, shale partings.....	3.2	552.5	
Sandstone	5.2	557.7	
Blue shale.....	8.0	565.7	
Sand shale.....	5.1	570.8	
Coal, No. 9 Pocahontas, (796.6' L.)	2.2	573.0	112.1'
Slate, coal partings.....	1.4	574.4	
Dark shale.....	1.5	575.9	
Fire clay.....	1.2	577.1	
Dark shale.....	0.6	577.7	

	Thickness Feet.	Total Feet.
Blue shale.....	5.4	583.1
Sandstone, shale partings 5.9' }		
Sandstone, very hard...30.4 }		
Conglomerate 1.0 }		
Sandstone, very hard... 2.0 }		
Conglomerate .....11.7 }	72.6	655.7
Sandstone, very hard...21.6 }		
Blue shale.....	17.3	673.0
Coal, No. 6 Pocahontas, (692.12' L.).....	4.48	677.48
Fire clay.....	0.5	677.98
Slate	4.42	682.4

In the above record the **Sewell Coal** has been correctly correlated, since the great sandstone mass at 67 feet from the top undoubtedly represents the Guyandot which forms the cliffs close down near the bed of Laurel Fork, less than two miles eastward, where it belongs 55 to 70 feet above the Sewell Coal. This correlation, as also those for the other strata, is further corroborated by the logs of borings given below for Slab Fork District.

Detailed Records for Slab Fork District.

In Slab Fork District (Wyoming), considerable prospecting, or a total of 13 bore holes, has been made with the diamond drill to test the character of the underlying coals, one being just across the Raleigh County Line. Of these, **Nos. 11, 12 and 14 on Map II**, have already been published in Chapter IV, in connection with the sections for Maben—2.1 Miles Southwest, Maben, and Left Fork of Allen Creek, pages 70, 69 and 72, respectively. These are important and should be studied closely before taking up the records of other borings in this region, given below.

The **Western Pocahontas Coal & Lumber Co. No. 6 Boring (No. 2 on Map II)**, drilled in the northwestern edge of Slab Fork District, on Laurel Fork, 1.8 miles northeast of the one last described, and 0.8 mile southeast of the mouth of Glen Fork, struck a strong flow of gas, according to natives in this locality, and had to be abandoned.

The six following records by the same Company, with the exception of No. 13 on Map II, are all within the borders of Slab Fork District:

Coal Test Boring (No. 3 on Map II).

Slab Fork District, on Laurel Branch of Laurel Creek, $2\frac{1}{2}$ miles northwest of Saulsville; well No. 7 by Western Pocahontas Coal & Lumber Co.; authority, E. M. Merrill, Beckley, W. Va.; elevation, 1863.1' L.

	Thickness	Total
	Ft. In.	Ft. In.
Clay and boulders.....	8 0	8 0
Sandstone	3'	
Hard broken sandstone 7		
Red broken sandstone. 8	Guyandot.. 63 0	71 0
Broken sandstone.....19		
Hard broken sandstone 14		
Broken sandstone.....12		
Gray slate.....	7 0	78 0
Sandy slate	30 0	108 0
Sandstone, Lower Guyandot and Welch	108 0	216 0
Coarse sandstone.....	11 0	227 0
Sandstone with shale partings.....	7 0	234 0
Slaty sandstone.....63'	Upper Raleigh 83 0	317 0
Sandstone		
Coal, Little Raleigh, (1545.3' L.)	0 10	317 10
Sandstone	2 8	320 6
Gray slate with hard bands.....	7 6	328 0
Tough blue slate.....	19 0	347 0
Sandy slate	7 0	354 0
Sandstone	2 0	356 0
Blue slate.....	1 0	357 0
Sandstone, Lower Raleigh	34 8	391 8
Slate	0 2	391 10
Coal, Beckley, (1467.9' L.)	3 4	395 2
Shale	1 10	397 0
Sandstone	12 0	409 0
Sandy slate.....	6 0	415 0
Sandstone, Quinnimont	68 0	483 0
Sandy slate.....	6 0	489 0
Gray slate with hard bands, Quinnimont	7 0	496 0
Dark slate with coal partings.....	1 7	497 7
Coal. 2' 9"		
Slate 0 10	Fire Creek, (1361.5' L.). 4 0	501 7
Coal. 0 5		
Slate	13 5	515 0
Gray slate with hard bands.....	22 2	537 2
Shale and coal, mixed.....	1 2	538 4
Gray slate with hard bands.....	4 8	543 0
Sandy slate	18 10	561 10
Slate with coal partings.....	0 10	562 8
Sandy slate.....	2 4	565 0
Slate with hard bands.....	6 0	571 0
Sandy slate.....	22 0	593 0
Slate with hard bands.....	2 0	595 0
Sandy slate with hard bands.....	10 0	605 0
Dark sandy slate.....	9 0	6140
Dark slate.....	17 0	631 0
Fire clay.....	6 0	637 0
Soft slate with coal partings, No. 9		
Fire clay.....	2 0	642 0
Pocahontas	3 0	640 0



PLATE XIV—Showing topography of the New River and Pocahontas Groups, looking eastward up Elkhorn Creek from point over the tunnel at Welch, McDowell County.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone	12	0	654	0
Fire clay.....	3	0	657	0
Conglomerate	4	3	661	3
Coal, No. 7 Pocahontas, (1200.6' L.)...	1	3	662	6
Shale with coal partings.....	0	9	663	3
Fire clay.....	2	9	666	0
Sandstone, Pierpont.....	36	4	702	4
Black shale.....	1	9	704	1
Coal, No. 6 Pocahontas, (1155.8' L.)...	3	3	707	4
Sandy slate.....	2	2	709	6

Samples for analyses were taken from the cores of the Beckley, Fire Creek and No. 6 Pocahontas Coals in the above boring, the compositions of which, as reported by Mr. Merrill, are given on subsequent pages of this Chapter under the description of the respective beds.

Coal Test Boring (No. 4 on Map II).

Slab Fork District, on west side of Laurel Fork, $\frac{1}{2}$ mile southwest of McGraw; well No. 5 by Western Pocahontas Coal & Lumber Co.; authority, E. M. Merrill, Beckley, W. Va.; elevation, 1745.7' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Casing	13	6	13	6
Very hard sandstone 4' 8" }	9	1	22	7
Dark sandstone, shale }				
partings 4 5 }	Guyandot			
Dark shale.....	2	1	24	8
Blue shale.....	2	7	27	3
White shale.....	3	3	30	6
Very hard sandstone.....	12	1	42	7
Dark shale.....	8	3	50	10
Sandstone	29	7	80	5
Dark shale.....	2	3	82	8
Sandstone, Lower Guyandot.....	32	2	114	10
Coal, Sewell, (1628.9' L.).....	2	0	116	10
Fire clay.....	0	8	117	6
Shale, sandstone partings.....	28	1	145	7
Shale, sandstone partings.....	35	5	181	0
Blue shale.....	12	6	193	6
Shale, sandstone partings.....	20	2	213	8
Black shale.....	0	11	214	7
Sandstone, shale partings.....	8	7	223	2
Soft sandstone.....	18	4	241	6
Very hard sandstone, Lower Raleigh..	54	9	296	3
Dark shale.....	1	3	297	6
Soft sandstone.....	1	4	298	10
Sandstone, very hard.....	11	11	310	9
Blue shale.....	3	1	313	10
Sandstone	13	0	326	10

	Thickness		Total
	Ft.	In.	Ft. In.
Shale, sandstone partings.....	0	11	327 9
Sandstone	8	10	336 7
Sandstone with coal partings (Beckley)	1	3	337 10
Blue shale.....	0	10	338 8
Sandstone	0	3	338 11
Blue shale.....	1	2	340 1
Sand shale.....	1	1	341 2
Sandstone	2	6	343 8
Blue shale.....	3	4	347 0
Sandstone	3	8	350 8
Blue shale.....	0	3	350 11
Sandstone	11	2	362 1
Sand shale.....	1	6	363 7
Sandstone, coal partings.....	9	7	373 2
Sandstone	2	6	375 8
Black shale.....	0	5	376 1
Slate	0	2	376 3
Bone	0	1	376 4
Dark shale.....	0	3	376 7
Bone	1	1	377 8
Dark shale.....	1	5	379 1
Sandstone	20	0	399 1
Dark shale.....	6	6	405 7
Sand shale.....	2	3	407 10
Coal, Fire Creek, (1336' L.).....	1	10	409 8
Slate	0	1	409 9
Dark shale.....	4	1	413 10
Bone	0	11	414 9
Dark shale.....	0	11	415 8
Slate	0	9	416 5
Sand shale.....	4	4	420 9
Blue shale.....	1	3	422 0
Sandstone, shale partings.....	14	9	436 9
Blue shale.....	15	11	452 8
Slate	0	9	453 5
Blue shale.....	6	2	459 7
Shale, sandstone partings.....	4	7	464 2
Blue shale.....	12	7	476 9
Bone	0	2	476 11
Black shale.....	1	6	478 5
Sand shale.....	14	11	493 4
Shale, sandstone partings.....	1	4	494 8
Sand shale.....	10	6	505 2
Dark shale.....	27	3	532 5
Sand shale.....	30	1	562 6
White sandstone.....	1	0	563 6
Sand shale.....	4	8	568 2
White sandstone.....	3	6	571 8
Conglomerate to bottom.....	4	7	576 3

According to Gawthrop. 50 feet of the Guyandot Sandstone is exposed above the well mouth at the location of the boring.

Coal Test Boring (No. 5 on Map II).

Slab Fork District, on Trough Fork of Laurel Fork, 3.0 miles northeast of McGraw; well No. 3 by Western Pocahontas Coal & Lumber Co.; authority, E. M. Merrill, Beckley, W. Va.; elevation, 1820.1' L.

	Thickness	Total
	Feet.	Feet.
Surface	17.0	17.0
Broken sand shale.....	5.0	22.0
Dark shale.....	9.6	31.6
Coal, laeger, (1788.2' L.).....	0.3	31.9
Fire clay.....	0.8	32.7
Sandstone, Middle laeger , and shale partings	25.0	57.7
Shale and sandstone partings.....	17.0	74.7
Sandstone and shale partings.....	19.5	94.2
Shale and sandstone partings.....	11.6	105.8
Sandstone and shale partings.....	11.6	117.4
Blue shale.....	7.9	125.3
Very hard sandstone, Guyandot	105.1	230.4
Sandstone and coal partings, Sewell "B" ...	0.3	230.7
Very hard sandstone.....	3.2	233.9
Sandstone and shale partings.....	8.0	241.9
Shale and sandstone partings.....	7.9	249.8
Blue shale.....	22.9	272.7
Bone, Sewell "A"	0.5	273.2
Sandstone, Lower Guyandot	27.2	300.4
Sandstone and coal partings	2.3	302.7
Coal, Sewell, (1514.5' L.).....	2.9	305.6
Sand shale.....	2.5	308.1
Blue shale.....	1.1	309.2
Sandstone and shale partings.11.7' } Welch ..	43.8	353.0
Shale and sandstone partings.32.1 }		
Dark shale.....	1.2	354.2
Coal, Welch, (1465.3' L.).....	0.3	354.5
Sandstone, very hard 154.5' } Upper and		
Conglomerate 8.0 } Lower Raleigh ..	162.5	517.0
Sand shale.....	10.5	527.5
Slate	0.5	528.0
Bone	0.5	528.5
Black slate.....	0.4	528.9
Bone	0.5	529.4
Coal .....1.0' }		
Black slate...0.3 } Beckley, (1287.9' L.)....	2.8	532.2
Coal .....1.5 }		
Fire clay.....	2.2	534.4
Sand shale.....	4.3	538.7
Sandstone	1.0	539.7
Sandstone and shale partings.....	23.0	562.7
Sandstone	4.9	567.6
Coal, (1252.3' L.).....	0.2	567.8
Sandstone	17.9	585.7
Sand shale.....	15.1	600.8
Blue shale.....	1.3	602.1
Coal, Fire Creek, (1214.1' L.).....	3.9	606.0
Sandstone and shale partings to bottom....	1.5	607.5

The above record is very important, in that the true position of the Iaeger, Sewell "B" and Welch Coals is exhibited. A sample of the core from the Sewell Coal was collected for analysis, the composition of which, as reported by Mr. Merrill, is given on subsequent pages of this Chapter under the description of this seam. The sandstone mass at 125.3 feet undoubtedly represents the Guyandot, the great cliff-rock, 3 miles southwestward at McGraw—its type locality as described in Chapter VI, page 194.

Coal Test Boring (No. 6 on Map II).

Slab Fork District, on Laurel Fork, at mouth of Lewis Fork, 3.2 miles N. 76° E. of McGraw; well No. 4 by Western Pocahontas Coal & Lumber Co.; authority, E. M. Merrill, Beckley, W. Va.; elevation, 1823.8' L.

	Thickness Feet.	Total Feet.
Casing	9.0	9.0
Sandy shale.....	9.1	18.1
Shale	0.7	18.8
Coal, Iaeger, (1804.7' L.)	0.3	19.1
Sandstone	5.1	24.2
Sandstone with coal partings.....	2.7	26.9
Sandstone	2.2	29.1
Slate	1.0	30.1
Sandstone with shale partings.....	9.5	39.6
Sandstone, very hard. 16.6' } Sandstone with shale partings 18.3 } Harvey Con-		
Sandstone, very hard. 3.3 } glomerate	42.5	82.1
Shale, sandstone..... 2.1 }		
Sandstone, very hard. 2.2 }		
Sand shale.....	4.9	87.0
Blue shale, Sandy Huff	44.0	131.0
Coal, Castle, (1691.4' L.)	1.4	132.4
Sandstone 4.1' } Sandstone with shale part- } Guyandot.	79.6	212.0
ings..... 2.1 }		
Sandstone, very hard..... 73.4 }		
Dark shale.....	7.1	219.1
Coal, Sewell "B", (1604.3' L.)	0.4	219.5
Slate	0.2	219.7
Fire clay.....	2.1	221.8
Sand shale.....	22.2	243.0
Dark shale.....	1.6	244.6
Sandstone with shale partings.....	4.3	248.9
Dark shale.....	2.7	251.6
Sand shale.....	1.2	252.8
Dark shale.....	9.1	261.9
Sandstone	26.9	288.8
Coal, Sewell "A" (1534.5' L.)	0.5	289.3

	Thickness Feet.	Total Feet.
Slate	0.2	289.5
Sand shale.....	30.3	319.8
Slate	0.9	320.7
Coal, Sewell, (1501.0' L.)	2.1	322.8
Fire clay.....	0.9	323.7
Sand shale.....	55.9	379.6
Sandstone .....19.8'	} Upper Raleigh..	62.1 441.7
Fire clay..... 4.0		
Sandstone .....10.7		
Sandstone, very hard.15.0		
Sand shale.....10.7		
Sandstone, very hard. 1.9	} Lower Raleigh..	51.9 540.1
Sand shale.....		
Blue shale.....		
Sand shale..... 4.4'		
Sandstone with shale partings .....17.4		
Blue shale.....11.3	} Lower Raleigh..	51.9 540.1
Sandstone, very hard. 3.4		
Coal 0.1		
Fire clay..... 5.7		
Sand shale..... 4.4		
Sandstone 5.2	}	0.9 541.0
Blue shale.....		
Slate		
Coal, Beckley (1282.4' L.)		
Fire clay.....		
Sandstone	12.9	557.7
Sandstone with coal partings.....	11.6	569.3
Sandstone, Quinnimont	22.8	592.1
Sandstone with coal partings.....	3.3	595.4
Coal, (1228.35' L.)	0.05	595.45
Sandstone with shale partings.....	4.6	600.05
Blue shale.....	0.4	600.45
Coal, (1223.25' L.)	0.05	601.5
Sand shale.....	13.2	614.7
Blue shale.....	1.9	616.6
Coal, Fire Creek, (1201.1' L.)	6.1	622.7
Blue shale to bottom.....	2.3	625.0

A sample of the core from the Fire Creek Coal in the above boring was collected, the composition of which, as reported by Mr. Merrill, is given on a subsequent page under the description of this seam. It is a very important bed in this region as shown by its thickness in this and other borings, and by the analysis in question.

Coal Test Boring (No. 7 on Map II).

Slab Fork District, in drain on south side of Milam Fork, 2.6 miles southeast of McGraw; well No. 8 by Western Pocahontas Coal & Lumber Co.; authority, E. M. Merrill, Beckley, W. Va.; elevation, 1837.6' L.

	Thickness		Total
	Ft.	In.	Ft. In.
Clay	9	8	9 8
Slaty sandstone.....	5	4	15 0
Broken slaty sandstone.....	17	0	32 0
Slate	5	0	37 0
Slate, blue.....	8	6	45 6
Clay and gravel.....	2	6	48 0
Blue slate.....	6	0	54 0
Sandy slate.....	9	0	63 0
Sandstone	19	0	82 0
Medium hard sandstone.. 19'	Guyandot	70 0	152 0
Hard sandstone..... 11			
Sandstone, hard, broken.. 40			
Sandstone	25	2	177 2
Coal, Sewell "B", (1660.0' L.).....	0	5	177 7
Slate	2	5	180 0
Sandstone	31	4	211 4
Sandy slate.....	5	8	217 0
Dark slate with hard bands.....	12	6	229 6
Sandstone	1	3	230 9
Coal 0' 3"	Sewell "A"	1 3	232 0
Slate with coal part-ings 1 0			
Sandstone, Lower Guyandot.....	44	0	276 0
Sulphur band.....	0	2	276 2
Coal 0' 9"	Sewell...	2 8	278 10
Slate 0 3			
Coal 1 8			
Black slate.....	4	2	283 0
Sandy slate.....	43	6	326 6
Sandstone, Upper Raleigh.....	42	0	368 6
Coal, (1469.0' L.).....	0	1	368 7
Sandstone	4	5	373 0
Sandy slate.....	4	0	377 0
Black slate.....	1	0	378 0
Sandy slate.....	4	0	382 0
Slaty sandstone.....	1	0	383 0
Sandstone	7	7	390 7
Coal, Little Raleigh, (1445.6' L.).....	1	5	392 0
Black slate.....	1	0	393 0
Sandy slate.....	16	0	409 0
Slaty sandstone..... 6	Lower Raleigh Sandstone	80 6	489 6
Sandy slate.....18			
Dark slate with hard bands .....17			
Sandy slate.....12			
Slate 6			
Sandstone .....21.5			
Sandy slate.....	11	6	501 0

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Dark slate with hard bands.....	6	9	507	9	
Coal, "War Creek"—Beckley, (1327.6' L.)	2	2	509	11	
Sandstone, Quinimont..	66	8	576	7	
Coal, (1256.0' L.) Fire Creek.....	5	0	581	7	
Slaty fire clay.....	5	5	587	0	
Slate	5	0	592	0	
Sandy slate.....	41	0	633	0	
Soft slate with small coal partings.....	4	4	637	4	
Coal, Little Fire Creek, (1198.9' L.)....	1	5	638	9	
Soft slate with small coal partings.....	1	9	640	6	
Slaty sandstone..... 7' 6"	Pineville..	89	6	730	0
Dark sandy slate.... 24 0					
Slate shale..... 4 0					
Sandy shale..... 10 0					
Slaty sandstone..... 21 0					
Sandstone					
Conglomerate 1 0					
Sandstone with slate partings	Pierpont.	41	0	771	0
Sandstone					
Sandstone, very hard 12' 0"					
Sandstone					
Brown shale..... 2 0					
Sandstone					
Black shale with hard bands.....	7	0	778	0	
Dark s'ate.....	4	11	782	11	
Coal, No. 6 Pocahontas, (1054.2' L.)....	0	6	783	5	
Fire clay.....	1	7	785	0	
Light shale.....	2	0	787	0	
Sandy shale.....	2	0	789	0	
Sandstone, Eckman.....	22	8	811	8	
Coal, No. 4 Pocahontas, (1025.7' L.)....	0	2	811	10	
Sandy slate.....	8	2	820	0	
Sandstone, Upper Pocahontas.....	68	0	888	0	
Sandy slate.....	3	0	891	0	
Coal 1' 1"	No. 3 Pocahontas	2	6	893	6
Bone coal..... 0 4					
Coal 1 1					
Sandy slate.....	10	6	904	0	
Slaty sandstone.....	12	0	916	0	
Sandy slate.....	3	1	919	1	
Coal 0' 6"	No. 2 "A" Pocahontas	1	2	920	3
Bone coal 0 4					
Coal 0 4					
Sandy s'ate.....	4	9	925	0	
Sandstone	3	0	928	0	
Sandy slate.....	6	9	934	9	
Dirty coal, No. 2 Pocahontas.....	0	7	935	4	
Shale	2	8	938	0	
Sandy slate.....	3	0	941	0	
Sandstone, Vivian.....	29	0	970	0	
Hard sandstone with coal parting (No. 1 Pocahontas)	6	0	976	0	

	Thickness Ft. In.	Total Ft. In.
Sandstone	11 0	987 0
Slaty sandstone.....	11 0	998 0
Sandy slate to bottom.....	2 0	1000 0

A sample of the core from the Fire Creek Coal in the above boring was collected, the composition of which, as reported by Mr. Merrill, is given on a subsequent page of this Chapter under the description of this seam.

Coal Test Boring (No. 13 on Map II).

Slab Fork District, Raleigh County, on Grave Fork, 0.3 mile north of Hotchkiss; well No. 2 by Western Pocahontas Coal & Lumber Co.; authority, H. N. Eavenson, and permission to publish by Geo. W. Stevens, President of the C. & O. Ry. Co.; elevation, 1738' L.

	Thickness Ft. In.	Total Ft. In.	
Sandy clay and boulders	12 0	12 0	
Slate, sandy.....31' 4" } Quinnimont			
Slate 0 11 } Shale....	32 3	44 3	
Coal, Fire Creek, (1690' L.).....	3 8	47 11	47' 11"
Slate, sandy.....	2 1	50 0	
Sandstone	11 0	61 0	
Slate, sandy.....	16 0	77 0	
Sandstone, slaty.....	20 0	97 0	
Slate	4 3	101 3	
Coal, Little Fire Creek?.....	1 2	102 5	54' 6"
Slate, sandy.....	12 7	115 0	
Sandstone, Pineville	14 0	129 0	
Slate, sandy.....	29 0	158 0	
Slate	24 0	182 0	
Sandstone, slaty 32' } Flattop	38 0	220 0	
Sandstone 6 }			
Slate	5 0	225 0	
Sandstone 9' } Pierpont	22 0	247 0	
Sandstone, slaty 13 }			
Slate	2 6	249 6	
Coal 0' 2" } No. 6 Pocahontas	2 8	252 2	149' 9"
Bone 0 2 }			
Coal 2 4 }			
Slate, sandy.....	5 10	258 0	
Sandstone, slaty.....	10 10	268 10	
Coal and slate.....0' 8" }			
Slate .....0 2 }			
Coal .....0 10 }	2 1	270 11	18' 9"
Coal, slaty.....0 5 }			
Slate	3 1	274 0	
Sandstone 22' }			
Slate, sandy.... 4 }	74 0	348 0	
Sandstone, hard. 48 }			

		Thickness		Total				
		Ft.	In.	Ft.	In.			
Slate	7	0	355	0			
Sandstone, Upper Pocahontas	32	8	387	8			
Slate	0	8	388	2			
Coal	1' 6"	} No. 3 Pocahontas..	2	8	390	10	119' 11"	
Bone	0 1							(1347.2' L.)
Coal	1 0							
Sandstone, slaty, Lower Pocahontas	....	29	3	420	1		
Slate	.....	5	3	425	4		
Coal, No. 2 "A" Pocahontas	.....	0	5	425	9	34' 11"	
Slate	.....	2	4	428	1		
Sandstone, slaty	.....	4	0	432	1		
Sandstone	.....	11	0	443	1		
Slate	.....	2	0	445	1		
Coal, No. 2 Pocahontas	.....	1	7	446	8	20' 11"	
Slate	.....	2	4	449	0		
Sandstone, Vivian	.....	53	0	502	0		
Sandstone, slaty, to bottom	.....	6	0	508	0	61' 4"	

In addition to the foregoing borings in Slab Fork, three others have been sunk within the District, the detailed records of which have been published in a former Report of the State Survey. The following table, which explains itself, has been prepared for ready reference to these borings:

List of Slab Fork District Borings Published in Other State Reports.

No. on Map II	NAME.	LOCATION.	Pages of Vol. II(A)
8	W. N. Page, Trustee, No. 6	Saulsville, 0.5 mi. S. of...	95
9	W. N. Page, Trustee, No. 2	Maben, 2.5 mi. N. W. of..	90
10	W. N. Page, Trustee, No. 1	Saulsville, 1¾ mi. S. E. of	88

The accurate correlations of the principal coals in the borings listed above are indicated in the table of Summarized Records of Tests for Coal in Wyoming County, given, on a preceding page of this Chapter, from which, by the intelligent use of the General Section of the Pottsville Measures, pages 51-60, and the logs of other borings in the same region, it is possible to determine the correlation of the minor beds, as space was not permitted for the republication of their records in this Report.

Detailed Records in Center District.

Center District (Wyoming), lying immediately southwest of that last described, has had eight coal test borings sunk within its boundaries. Of these, Nos. 15 and 22 on Map II are published in Chapter IV in connection with the sections for Pineville—Sugar Run and Little Whiteoak Creek, pages 74 and 77, respectively. As shown in the following table, the detailed logs of two others have been published in a former State Survey Report:

List of Center District Borings Published in Other State Reports.

No. on Map II	NAME.	LOCATION	Pages of Vol. II(A)
16	W. N. Page, Trustee, No. 4	Pineville, 1¼ mi. N. E. . .	91
21	U. S. Coal & Coke Co. No. 46	On Indian Creek, 1 mi. S. E. of Fort Branch. . . .	101

Boring No. 16 on Map II, listed above, starts 75 feet by hand-level below an opening in the **Beckley Coal**, as determined by the writer; hence, the correlations given for the principal coals in the table of Summarized Records of Coal Borings in Wyoming, on a preceding page of this Chapter.

Coal Test Boring No. 17 on Map II, located on the north bank of Guyandot River, ½ mile west of Pineville and just below the mouth of Williamson Branch, starts 193 feet, as determined with hand-level by the writer, below an opening in the **Beckley Coal**. The Survey was unable to obtain the log of this boring or any reliable information concerning it. Reports are current in the immediate locality that no minable coal was encountered, but it is questionable whether or not it penetrated deep enough to test the **No. 3 Pocahontas Coal**, as the latter should belong in this boring at a depth of about 325 feet.

The following is the record of a diamond drill boring in the southwestern edge of the same District, on the waters of Indian Creek. It starts, as determined by the writer with aneroid, 195 feet below the Sewell Coal:

Coal Test Boring (No. 17A on Map II).

Center District, at mouth of Turkeywallow Branch, 0.6 mile south of Mulberry; well by Geo. F. Lasher et al.; authority, W. R. Graham; elevation, 1300' B.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Casing	14	6	14	6	
Sandstone	3	4	17	10	
Coal, Beckley.....	0	10	18	8	18' 8"
Fire clay.....	1	5	20	1	
Sandstone, shaly.....	13	0	33	1	
Slate, blue.....	19	3	52	4	
Coal	0	1	52	5	
Shale, blue.....	0	6	52	11	
Sand shale.....	1	6	54	5	
Sandstone, Quinnimont.....	76	1	130	6	
Coal .....1' 9" } Fire					
Coal, "mother".....0 5 } Creek..	2	2	132	8	114' 0"
Sand shale.....	1	5	134	1	
Sandstone	18	5	152	6	
Sand shale.....	5	4	157	10	
Shale, dark.....	31	5	189	3	
Slate, black.....	1	0	190	3	
Coal .....3' 11" }					
Slate and coal partings .....1 0 }					
Coal .....0 9 }	6	3	196	6	63' 10"
Slate and coal partings .....0 7 }					
Sand shale.....	3	7	200	1	
Sandstone, Pineville.....	30	4	230	5	
Shale, blue.....	1	10	232	3	
Coal and slate, No. 9 Pocahontas (1067' B.).....	0	9	233	0	36' 6"
Shale, blue.....	0	8	233	8	
Shale, blue, with sandstone partings	7	0	240	8	
Shale, sandy.....	24	0	264	8	
Coal and slate, No. 8 Pocahontas..	1	8	266	4	33' 4"
Sand shale.....	5	9	272	1	
Sandstone, Flattop Mountain.....	17	11	290	0	
Shale, blue, Rift.....	2	9	292	9	
Slate and coal partings, No. 7 Pocahontas	2	9	295	6	29' 2"
Shale, blue.....	1	0	296	6	
Sandstone and shale partings .....21' 2" }					
Sandstone, hard.....49 10 }					
Conglomerate ..18 0 }	113	8	410	2	
Conglomerate with coal partings 1 6 }					
Sandstone .....23 2 }					
Shale, dark.....	28	10	439	0	

		Thickness Ft. In.	Total Ft. In.	
Coal	.....0' 5 "	1 4½	440 4½	No. 6 Pocahontas..... 144' 10½"
Slate	.....0 0½			
Coal	.....0 11			
Fire clay	.....	2 10½	443 3	
Sandstone, Eckman	.....	43 2	486 5	
Slate	.....	0 3	486 8	
Shale and sandstone	.....	29 6	516 2	
Coal, No. 4 Pocahontas	.....	1 2	517 4	76' 11½"
Sandstone	.....	1 8	519 0	
Shale, light	.....	3 11	522 11	
Coal and slate	.....	0 3	523 2	
Shale, light	.....	1 2	524 4	
Coal	.....	0 1	524 5	
Shale, light	.....	2 3	526 8	
Shale, sandy	.....	5 7	532 3	
Shale, dark	.....	1 1	533 4	
Coal	.....0' 1½"	5 9	539 1	No. 3 Pocahontas.. 21' 9" (761' B.)
Shale, blue	..0 8½			
Coal and slate	0 1			
Coal	.....1 8	1 8	540 9	No. 2 "A" Pocahontas . 15' 3"
Slate	.....0 2			
Coal	.....3 0			
Shale, dark	.....	7 9	548 6	
Shale, sandy	.....	4 6	553 0	
Coal	.....0' 2½"	1 4	554 4	No. 2 Pocahontas . 15' 3"
Slate	.....0 4½			
Coal	.....0 9			
Fire clay	.....	1 0	555 4	
Shale, sandy	.....	24 2	579 6	
Shale and coal	.....	0 5	579 11	No. 2 Pocahontas.. 25' 7"
partings	..0' 4"			
Coal	.....0 1			
Fire clay	.....	2 8	582 7	
Shale, sandy	.....	10 2	592 9	
Sandstone, Vivian	.....	46 1	638 10	
Shale, sandy	.....	1 2	640 0	60' 1"

The Survey was unable to obtain any information concerning Coal Test Borings Nos. 18 and 19 in the southern edge of Center District, on Indian Creek, the former being located 0.4 mile above the mouth of Bailey Branch, and the latter, at the mouth of Whiteoak Branch.

The following is the record of a boring located in the southern edge of the same District on the north bank of Indian Creek, 0.2 mile above the mouth of Fort Branch. It exhibits Nos. 6, 4 and 3 Pocahontas Coals in fair development:

Coal Test Boring (No. 20 on Map II).

Center District, on north side of Indian Creek, $\frac{1}{4}$ mile above Fort Branch; well No. 45 by U. S. Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1628' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sand and gravel.....	9	0	9	0	
Sandstone	4	7	13	7	
Coal, Little Fire Creek.....	0	6	14	1	14' 1"
Fire clay.....	2	11	17	0	
Sandstone, Pineville.....	27	0	44	0	
Slate, sandy.....	17	3	61	3	
Coal, No. 9 Pocahontas.....	1	2	62	5	48' 4"
Slate, sandy.....	24	7	87	0	
Sandstone, Flattop Mountain.....	34	0	121	0	
Slate, sandy.....13' 0" } Rift	22	1	143	1	
Slate 9 1 }					
Coal, No. 7 Pocahontas.....	1	2	144	3	
Slate	2	9	147	0	
Sandstone, Pierpont.....	67	0	214	0	
Slate	5	0	219	0	
Slate, sandy.....	17	0	236	0	
Sandstone	19	7	255	7	
Coal, No. 6 Pocahontas.....	2	6	258	1	195' 8"
Slate	2	11	261	0	
Slate, sandy.....	6	0	267	0	
Sandstone, Eckman.....	60	0	327	0	
Slate	2	10	329	10	
Coal, No. 4 Pocahontas.....	3	2	333	0	74' 11"
Slate	7	0	340	0	
Slate, sandy.....	12	7	352	7	
Coal	0	8	353	3	20' 3"
Slate, sandy.....	6	9	360	0	
Slate	7	0	367	0	
Sandstone, Upper Pocahontas.....	20	0	387	0	
Slate	18	4	405	4	
Coal .....0' 4" } No. 3					
Slate .....0 6 } Pocahontas .	5	7	410	11	57' 8"
Coal .....4 9 } (1217.1' L.)					
Slate	3	1	414	0	

Detailed Records in Barkers Ridge District.

Barkers Ridge District, occupying the southeastern point of Wyoming County, has had only four borings sunk within its borders, of which **No. 23 on Map II** is a water well or churn-drill boring for the round-house of the Virginian Railway at the mouth of Barkers Creek. According to Mr. O. W. Hawhee, a pumper, it penetrated to a depth of 136 feet without encountering any coal. It starts 35 feet below the crop of the

No. 2 Pocahontas Coal and 90 feet below the No. 3 Pocahontas bed in the point immediately to the northeast, as determined with aneroid by the writer.

On pages 99-100 of Volume II(A) of the State Survey Reports is published the detailed record of **Coal Test Boring No. 24 on Map II**, located in the same District, 3 miles southwestward at the mouth of Snyder Creek, tributary to Pinnacle. It only penetrated to a depth of 173 feet and exhibits the absence of the No. 4 Pocahontas Coal and the presence of the No. 3 Pocahontas bed in fine development.

The detailed record of **Coal Test Boring No. 25 on Map II**, located in the southwest portion of Barkers Ridge District, is published in connection with the Mouth of Whiteoak Creek Section, page 81, as also on page 100 of Volume II(A) of the State Survey Reports.

Coal Test Boring (No. 25A on Map II).

Barkers Ridge District, opposite the mouth of Belcher Branch, on north bank of Pinnacle Creek, 3 miles southeast of Pineville; well No. 47 by U. S. Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1352.4' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sand	10	0	10	0
Sand and gravel.....	4	0	14	0
Slaty sandstone.....	7	0	21	0
Slate	17	0	38	0
Sandstone, Flattop Mountain	49	0	87	0
Slate	3	0	90	0
Sandstone, Pierpont and Eckman ..	76	0	166	0
Slate	16	11	182	11
Coal, slaty	0	10	183	9
Slate, sandy.....	5	3	189	0
Slate	11	2	200	2
Coal, No. 4 Pocahontas	2	11	203	1
Slate	4	11	208	0
Sandstone	54	0	262	0
Slate	4	0	266	0
Slate, sandy.....	24	10	290	10
Coal, No. 3 Pocahontas, (1056' L.)	5	5	296	3
Slate to bottom.....	1	9	298	0
				1' 9"

Detailed Records in Baileysville District.

Baileysville District, lying in the southwest border of Wyoming County, has had four diamond drill borings sunk

within its borders to test the thickness and character of the Sewell ("Davy") Coal on the headwaters of Brier Creek. The detailed record of **Boring No. 28 on Map II**, located in this region, is published in connection with the Head of Brier Creek Section, page 172.

The three following records are from the other borings in this District:

Coal Test Boring (No. 26 on Map II).

Baileysville District, head of Marsh Fork of Brier Creek, 5 miles southeast of Baileysville; well No. 8 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1540' L.

		Thickness		Total
		Ft.	In.	Ft. In.
Surface		15	8	15 8
Blue shale and limestone partings		16	4	32 0
Coal	2' 9"	3	3	35 3
Soft slate and				
coal partings.	0 6			
Blue shale.....		1	9	37 0

Coal Test Boring (No. 27 on Map II).

Baileysville District, head of Brier Creek, 4.3 miles southeast of Baileysville; well No. 7 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1517' L.

		Thickness		Total
		Ft.	In.	Ft. In.
Surface		6	6	6 6
Sandstone, Guyandot		31	6	38 0
Sandstone and shale partings.....		7	0	45 0
Sandstone		10	0	55 0
Sand shale.....		9	6	64 6
Blue shale and limestone partings.		7	6	72 0
Black slate.....		1	6	73 6
Blue slate.....		14	9	88 3
Coal	2' 4 "	3	11¼	91' 4½"
Slate	0 0¾			
Coal	0 8¾			
Black slate.....		0	3	91 7½
Dark sand shale.....		2	5	94 0½
Sandstone and		65	5¾	159 6¼
shale parting 9' 8 "				
Sandy shale.....	19 3¾			
Hard sandstone..	26 0			
Real hard sand-		0	10	160 4¼
stone	10 6			
Coal, Welch		0	4	160 8¼
Dark slate.....		0	4	160 8¼

		Thickness	Total
		Ft. In.	Ft. In.
Sand shale.....		0 9¾	161 6
Sandstone.....0' 3½"	} Upper Raleigh		
Sand shale.....0 1½		1 4	162 10
Sandstone.....0 11			

The above record shows the Welch Coal thinned below minable dimensions in this locality.

Coal Test Boring (No. 29 on Map II).

Baileysville District, on head of Brier Creek, 5.3 miles southeast of Baileysville; well No. 9 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1625' L.

		Thickness	Total	
		Ft. In.	Ft. In.	
Surface		12 6	12 6	
Dark blue shale.....		39 10	52 4	
Sandstone, Guyandot		33 8	86 0	86' 0"
Dark shale.....		20 2	106 2	
Sandy shale.....		18 2	124 4	
Sandy shale and limestone partings		29 7½	153 11½	
Black slate.....		1 5½	155 5	
Soft slate and coal	} Sewell ("Davy")			
partings .....0' 1 "				
Coal .....2 9½				
Soft slate and coal	} Sewell ("Davy")			
partings .....0 5				
Hard slate and coal				
partings .....0 8		4 10½	160 3½	74' 3½"
Coal .....0 6				
Slate .....0 4				
Coal and sulphur	}			
partings .....0 1				
Sandy shale.....		0 5	160 8½	

RECORDS OF COAL TEST BORINGS IN McDOWELL COUNTY.

Summarized Records.

In McDowell County, coal test borings have been sunk, mostly with the diamond drill, in every District, excepting North Fork and Elkhorn, or a total of 143. As in Wyoming County, the elevation and location of the well mouth was determined, and likewise its geologic horizon in order to correlate the strata penetrated. The accompanying table contains

the summarized records of the most of these borings, as also two—Nos. 131 and 132 on Map II—just across the Virginia Line in the edge of Tazewell County. The same explanations as accompany the Wyoming table apply to that for McDowell. Under the column headed “Company”, the following abbreviations are used:

J. B. B. C. Co.....	Jewett, Bigelow & Brooks Coal Co.
McDowell Poca. C. & L. Co....	McDowell Pocahontas Coal & Land Co.
N. R. & Poca. Con. C. Co.....	New River & Pocahontas Consolidated Coal Co.
Poca. C. & C. Co.....	Pocahontas Coal & Coke Co.
Superior Poca. C. Co.....	Superior Pocahontas Coal Co.
U. S. C. & C. Co.....	United States Coal & Coke Co.
Va. Poca. C. Co.....	Virginia Pocahontas Coal Co.

Summarized Record of Tests for Coal

No. on Map.	COMPANY.	Magisterial District.	Elev. A. T.	Sewell Coal.	
				Depth Base.	Thickness Feet.
30	Panther Coal Co. (Water Well).....	Sandy River.....	951L		
31	Panther Lumber Co. No. 1.....	Sandy River.....	940B	528.9	0.0
32	Panther Lumber Co.....	Sandy River.....	1135B		
33	Panther Lumber Co.....	Sandy River.....	1235B		
34	Panther Lumber Co.....	Sandy River.....	1340B		
35	Poca. C. & C. Co.....	Sandy River.....	1477L		
36	Poca. C. & C. Co.....	Sandy River.....	1650B		
37		Sandy River.....	1080B		
38	McDowell Poca. C. & Land Co.....	Sandy River.....	1090HL		
39	McDowell Poca. C. & Land Co.....	Sandy River.....	1185B		
40	Clark & Krebs.....	Sandy River.....	1250B		
41		Sandy River.....	1327L		
42		Sandy River.....	1370B		
43	J. W. Dawson.....	Sandy River.....	1260B		
44	J. B. B. C. Co.....	Browns Creek.....	1390B	181.9	2.5
45	J. B. B. C. Co.....	Browns Creek.....	1420B	200.2	1.7
45A	Geo. F. Lasher, Trustee.....	Browns Creek.....	1145B		
46	J. B. B. C. Co. No. 1.....	Browns Creek.....	1320B	71.2	2.3
47	Big Sandy Creek C. & C. Co.....	Browns Creek.....	1204L		
48	J. B. B. C. Co. No. 2.....	Browns Creek.....	1521L	255.5	1.9
49	J. B. B. C. Co. No. 3.....	Browns Creek.....	1492L	193.1	4.4
50	J. B. B. C. Co. No. 4.....	Browns Creek.....	1692L	311.2	3.2
51	J. B. B. C. Co. No. 5.....	Browns Creek.....	1607L	158.5	6.5
52	Superior Poca C. Co.....	Browns Creek.....	1245L		
53	Geo. F. Lasher.....	Browns Creek.....	1265B		
54	Tug River Coal & Land Co. No. 1.....	Browns Creek.....	1295.4L		
55		Browns Creek.....	1295B		
56	Standard Poca. C. Co.....	Browns Creek.....	1481L		
57		Browns Creek.....	1530B		
58		Browns Creek.....	1295L		
59	Central Poca. C. Co.....	Browns Creek.....	1378L		
60	Pulaski Iron Co.....	Browns Creek.....	1571L		
61	Morrow Prospecting Co. No. 1.....	Browns Creek.....	1295L		
62	Pulaski Iron Co.....	Browns Creek.....	1310L		
63	Pulaski Iron Co.....	Browns Creek.....	1317L		
64	Huston Collieries Co.....	Browns Creek.....	1325B		
65	Va. Poca. C. Co.....	Big Creek.....	1456.83L		
66	Va. Poca. C. Co.....	Big Creek.....	1349.8L		
67	Lace Meadows.....	Big Creek.....	1410B		
68		Big Creek.....	1500B		
69	Va. Poca. C. Co. No. 6.....	Big Creek.....	1048L		
70	Va. Poca. C. Co.....	Big Creek.....	1439L		
71	Va. Poca. C. Co.....	Big Creek.....	1459L		
72	Va. Poca. C. Co.....	Big Creek.....	1483.83L		
73	Va. Poca. C. Co.....	Big Creek.....	1455.65L		
74	Va. Poca. C. Co.....	Big Creek.....	1474.03L		
75	U. S. C. & C. Co. No. 40.....	Big Creek.....	1635.5L		
76	Va. Poca. C. Co. No. 4.....	Big Creek.....	1608L		
77	Va. Poca. C. Co. No. 5.....	Big Creek.....	1499.8L		
78	Va. Poca. C. Co. No. 3.....	Big Creek.....	1537.83L		
79	Va. Poca. C. Co. No. 2.....	Big Creek.....	1662.37L		
80	Va. Poca. C. Co. No. 1.....	Big Creek.....	1654.65L		
81			1650B?		
81	Va. Poca. C. Co. No. 12.....	Big Creek.....	1727.83L		
82	Va. Poca. C. Co. No. 11.....	Big Creek.....	1773.95L		
83	Va. Poca. C. Co. No. 10.....	Big Creek.....	1662.2L		
84	Va. Poca. C. Co. No. 9.....	Big Creek.....	1584.04L		
85			1447.11L		
85	Va. Poca. C. Co. No. 8.....	Big Creek.....	1490.85L?		
86			1443B		
86	Va. Poca. C. Co. No. 7.....	Big Creek.....	1490.62L?		
87	Va. Poca. C. Co.....	Big Creek.....	1515B		
88			1390B		
88	Va. Poca. C. Co. No. 13.....	Big Creek.....	1633L		
89	Va. Poca. C. Co.....	Big Creek.....	1620B		
90	Va. Poca. C. Co. No. 14.....	Big Creek.....	1441L		
91	Dry Fork Poca. C. Co.....	Big Creek.....	1260B		
92	McDowell Poca. C. & L. Co.....	Big Creek.....	1290B		
93	Poca. C. & C. Co.....	Big Creek.....	1390B	36.8	2.5
94		Big Creek.....	1415B		
95		Big Creek.....	?		
96	N. R. & Poca. Con. C. Co. No. 21.....	Big Creek.....	1629.0L		
97	N. R. & Poca. Con. C. Co. No. 11.....	Big Creek.....	1544.9L		
98	N. R. & Poca. Con. C. Co. No. 10.....	Big Creek.....	1847.7L		
99	N. R. & Poca. Con. C. Co. No. 9.....	Big Creek.....	1747.6L		

in McDowell County.

Beckley Coal.		Fire Creek Coal		No. 6 Pocahontas Coal.		No. 4 Pocahontas Coal.		No. 3 Pocahontas Coal.		Total Depth.	No. on Map.
Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.		
										217.0	30
										602.3	31
										110.0	32
										22.5	33
											34
										87.0	35
										18.6	36
											37
120.9	1.5	232.0	2.7					684.6	2.2	792.5	38
125.3	2.9	245.4	1.9	527.4	1.8			718.2	0.9	718.2	39
		296.0	4.2							300.3	40
											41
											42
											43
											44
											45
84.2	1.2					688.9	0.9	676.7	0.3	800.0	45A
										71.2	46
						635.7	14.7	671.6	0.6	684.0	47
										261.5	48
										197.2	49
										391.0	50
										161.0	51
16.9	1.9	109.0	2.3			555.8	5.2	622.4	11.1	748.0	52
						474.9	2.4	545.4	7.9	579.0	53
				164.9	0.3	323.9	0.3	374.6	4.6	454.0	54
											55
				381.1	1.7	509.5	2.5	571.8	5.3	573.0	56
											57
						303.3	3.4	369.9	5.2	660.4	58
						253.0	4.8	315.2	4.3	344.4	59
				318.3	1.7	438.5	4.9	506.1	6.2	506.5	60
				176.9		238.5	5.4	300.2	5.4	300.2	61
						231.4	5.2	292.8	6.1	293.0	62
						195.1	4.1	265.6	5.2	288.0	63
						195.0	4.5				64
98.0	2.5	137.8	1.8	590.0	0.5	676.8	4.6	727.9	1.7	827.9	65
58.3	2.3	171.2	4.0	439.2	2.7	607.6	4.1			614.2	66
105.2	1.8	217.1	6.1							218.1	67
											68
260.0	2.0	352.5	2.5	689.5	0.5	779.3	5.3			779.3	69
28.3	0.7	130.3	4.0	539.7	0.3	592.3	0.9	667.6	0.2	734.3	70
		121.5	0.5	559.5	1.0			694.5	3.0	962.1	71
36.3	2.4	122.1	3.3	530.9	2.5	609.6	1.9	692.2	4.0	703.9	72
21.7	2.2	118.2	1.0	489.5	1.5			657.2	4.0	723.5	73
50.3	0.9	124.0	0.7	484.8	6.6	592.2	6.1	670.1	8.0	700.2	74
142.4	5.7	177.9	1.3			659.0	0.8	718.2	0.8	869.0	75
		137.3	1.3			641.3	6.3	694.2	0.2	694.2	76
44.5	2.5	170.3	2.3	481.5	0.5	569.5	5.0			574.0	77
		185.5	1.5			608.3	6.3	664.0	3.0	664.0	78
140.0	0.7	273.0	0.5	605.0	3.0	694.5	6.5	759.3	2.3	759.3	79
166.1	0.2			615.9	0.2	711.2	5.3	774.5	1.0	779.5	80
											81
244.9	3.9	370.6	0.6	673.5	3.5	744.8	6.8			744.8	81
		221.3	3.3	683.5	3.5	744.8	6.8			744.8	82
36.0	2.0	195.0	2.0	543.6	1.5	628.5	7.5	679.8	1.3	679.8	83
51.0	11.5	181.5	3.5	469.6	16.1	562.1	8.3			566.3	84
											85
24.5	3.5			484.2	2.7	568.5	6.3	625.5	9.3	625.5	85
											86
75.0	3.0	167.5	0.5	481.5	2.4	600.1	6.8			600.1	86
											87
											88
222.2	3.2	303.8	4.3	590.8	1.8	721.5	5.5			727.0	88
											89
155.5	2.5	208.0	1.0	580.5	0.5	653.7	6.0			661.0	90
49.9	2.3	188.8	1.5	471.3	0.3	558.9	5.9	582.0	1.0	583.0	91
						541.3	0.8	625.9	2.6	625.9	92
265.3	4.2									265.9	93
											94
		84.3	3.3	456.2	1.2	515.0	1.0	589.0	5.6	663.0	95
109.4	0.5	263.1	9.1	619.2	0.7	705.9	9.5	759.3	3.4	848.0	97
		125.4	2.9	415.8	0.3	499.3	1.0	580.8	5.9	591.3	98
				234.5	10.9	339.9	0.5	401.8	3.2	404.3	99

Summarized Record of Tests for Coal

No. on Map.	COMPANY.	Magisterial District.	Elev. A. T.	Sewell Coal.	
				Depth Base.	Thickness Feet.
100	N. R. & Poca. Con. C. Co. No. 8.....	Big Creek.....	1667.4L		
101	N. R. & Poca. Con. C. Co. No. 18....	Big Creek.....	273.9L		
102	N. R. & Poca. Con. C. Co. No. 1007?..	Big Creek.....			
103	N. R. & Poca. Con. C. Co. No. 12.....	Big Creek.....	1887.1L		
104	N. R. & Poca. Con. C. Co. No. 13.....	Big Creek.....	2064.7L		
105	N. R. & Poca. Con. C. Co. No. 2.....	Big Creek.....	1974L		
106	N. R. & Poca. Con. C. Co. No. 1.....	Big Creek.....	2210.05L		
107	N. R. & Poca. Con. C. Co. No. 3.....	Big Creek.....	2346.42L		
108	N. R. & Poca. Con. C. Co. No. 4.....	Big Creek.....	1836.05L		
109	N. R. & Poca. Con. C. Co. No. 7.....	Big Creek.....	1770.8L		
110	N. R. & Poca. Con. C. Co. No. 5.....	Big Creek.....	1690.56L		
111	N. R. & Poca. Con. C. Co. No. 23.....	Big Creek.....	1627.41L		
112	N. R. & Poca. Con. C. Co. No. 22.....	Big Creek.....	1478.4L		
113	N. R. & Poca. Con. C. Co. No. 24.....	Big Creek.....	1609.78L?		
114	N. R. & Poca. Con. C. Co. No. 6.....	Big Creek.....	1480.03L		
115	U. S. C. & C. Co. No. 57.....	Big Creek.....	1455L		
116		Big Creek.....	1800B		
117		Big Creek.....	2050B		
118		Big Creek.....	2370B		
119		Big Creek.....	2215B		
120	N. R. & Poca. Con. C. Co. No. 20.....	Big Creek.....	1703L		
121	N. R. & Poca. Con. C. Co. No. 22.....	Big Creek.....	1482.83L		
122	U. S. C. & C. Co., No. 56.....	Big Creek.....	1491.8L		
123	N. R. & Poca. Con. C. Co. No. 19.....	Big Creek.....	1613.6L		
124	U. S. C. & C. Co. No. 55.....	Big Creek.....	1530.9L		
125	U. S. C. & C. Co. No. 53.....	Big Creek.....	1552.5L		
126	U. S. C. & C. Co. No. 50.....	Big Creek.....	1567.55L		
127	U. S. C. & C. Co. No. 51.....	Big Creek.....	1637.91L		
128	U. S. C. & C. Co. No. 52.....	Big Creek.....	1718.94L		
129	U. S. C. & C. Co. No. 54.....	Big Creek.....	1891.6L		
130	U. S. C. & C. Co. No. 58.....	Big Creek.....	1811L		
131		Tazewell Co., Va.....	1925B		
132	U. S. C. & C. Co. No. 59.....	Tazewell Co., Va.....	2178L		
133	Jed Coal & Coke Co. No. 1.....	Adkin.....	1410B		
134	Jed Coal & Coke Co. No. 2.....	Adkin.....	1340L		
135	Jed Coal & Coke Co. No. 4.....	Adkin.....	1345B		
136	U. S. C. & C. Co. No. 36.....	Adkin.....	1437.93L		
137	U. S. C. & C. Co. No. 38.....	Adkin.....	1552.2L		
138	Jed Coal & Coke Co. No. 3.....	Adkin.....	1360B		
139	U. S. C. & C. Co. No. 28.....	Adkin.....			
140	U. S. C. & C. Co. No. 41.....	Adkin.....	1360B		
141	U. S. C. & C. Co. No. 35.....	Adkin.....	1415.38L		
142	U. S. C. & C. Co. No. 37.....	Adkin.....			
143	U. S. C. & C. Co. No. 39.....	Adkin.....	1515.06L		
144	U. S. C. & C. Co. No. 5.....	Adkin.....	1428L		
145	U. S. C. & C. Co. No. 11.....	Adkin.....	1601.6L		
146	U. S. C. & C. Co. No. 9.....	Adkin.....	1935.52L		
147	U. S. C. & C. Co. No. 8.....	Adkin.....			
148	U. S. C. & C. Co. No. 9.....	Adkin.....			
149	U. S. C. & C. Co. No. 4.....	Adkin.....			
150		Adkin.....			
151	U. S. C. & C. Co. No. 15.....	Adkin.....	1470.38L		
152	U. S. C. & C. Co. No. 18.....	Adkin.....	1544.51L		
153	U. S. C. & C. Co. No. 16.....	Adkin.....	1571.1L		
154	U. S. C. & C. Co. No. 3.....	Adkin.....			
155	U. S. C. & C. Co. No. 2.....	Adkin.....			
156	U. S. C. & C. Co. No. 1.....	Adkin.....			
157	U. S. C. & C. Co. No. 6.....	Adkin.....			
158	U. S. C. & C. Co. No. 12.....	Adkin.....			
159	U. S. C. & C. Co. No. 25.....	Adkin.....	1831.44L		
160	U. S. C. & C. Co. No. 10.....	Adkin.....			
161	U. S. C. & C. Co. No. 23.....	Adkin.....			
162	U. S. C. & C. Co. No. 22.....	Adkin.....			
163	U. S. C. & C. Co. No. 28.....	Adkin.....	1872.46L		
164	U. S. C. & C. Co. No. 27.....	Adkin.....	2004.88L		
165	U. S. C. & C. Co. No. 24.....	Adkin.....			
166	U. S. C. & C. Co. No. 26.....	Adkin.....	1983.88L		
167	U. S. C. & C. Co. No. 42.....	Adkin.....	1707.8L		
168	U. S. C. & C. Co. No. 21.....	Adkin.....	2004.1L		
169	U. S. C. & C. Co. No. 29.....	Adkin.....	1867L		
170	U. S. C. & C. Co. No. 19.....	Adkin.....	2010B		
171	U. S. C. & C. Co. No. 17.....	Adkin.....	1960B		
172	U. S. C. & C. Co. No. 30.....	Adkin.....	1887.9L		
173	U. S. C. & C. Co. No. 31.....	Adkin.....	2080L		

in McDowell County.—Continued.

Beckley Coal.		Fire Creek Coal		No. 6 Pocahontas Coal.		No. 4 Pocahontas Coal.		No. 3 Pocahontas Coal.		Total Depth.	No. on Map.
Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.	Depth Base.	Thickness Feet.		
51.3	1.5	161.0	0.5	405.5	1.5	136.5	0.5	183.5	2.5	187.0	100
						590.0	0.5	653.2	3.7	661.0	101
						250.7	0.7	320.2	3.2	328.1	102
						419.9	1.9	511.6	3.1	517.0	104
				230.5	0.5			370.0	0.0	501.2	105
		109.2	12.2	432.2	0.2	521.5	0.5	605.0	2.0	619.5	106
		174.0	2.5	542.1	8.1	675.6	0.6	739.5	2.3	780.0	107
				259.4	2.4	255.1	0.4	303.7	3.5	420.2	108
				183.2	0.5	294.2	0.2	358.8	3.1	363.0	109
				297.2	1.5	404.0	1.0	458.6	3.3	462.0	110
				236.8	0.8	325.7	0.7	401.6	3.6	405.3	111
				97.5	0.5	196.0	0.5	255.1	3.6	259.1	112
				321.6	0.9	431.1	0.3	478.6	3.0	481.6	113
				54.3	1.0			216.0	3.0	307.0	114
						83.3	1.4	168.9	4.9	190.0	115
											116
											117
											118
											119
		136.0	2.0	168.9	2.3	580.0	0.5	633.0	3.8	649.0	120
				186.7	1.7	264.7	1.2	351.6	4.1	352.0	121
				177.2	2.0			335.9	3.2	388.0	122
				304.6	2.6			501.0	1.0	760.0	123
						215.0	1.5	295.2	3.2	453.0	124
						113.0	2.5	212.5	6.5	221.0	125
						43.5	3.5	138.0	5.5	254.0	126
						93.5	7.8	163.5	4.0	165.0	127
						112.0	8.0	180.0	4.0	323.0	128
						340.0	9.0	406.0	3.0	418.0	129
				97.3	0.9	200.2	8.5	275.0	5.8	279.0	130
											131
						315.4	8.3	398.2	7.1	494.0	132
				181.6	0.2					240.2	133
										240.0	134
						211.2	8.2			214.5	135
				217.2	1.1	359.5	7.7	414.4	5.1	424.0	136
		109.6	3.8	450.5	6.5	526.8	7.4	580.6	2.5	587.0	137
				45.2	0.7	175.2	0.3			240.0	138
							2.6		5.7		139
						140.0	7.1	216.0			140
				290.4	1.3	224.4	8.3	297.9	8.1	310.0	141
							8.1		4.8		142
						376.8	1.9	445.2	3.5	513.0	143
						87.0	8.9	162.2	7.9	164.0	144
				129.7	14.2	234.3	0.9	302.5	5.7	316.0	145
		62.9	1.3					564.6	5.9	566.0	146
							2.4				147
							2.7		5.8		148
							6.1		6.1		149
							8.8		5.1		150
						105.4	7.7	169.8	4.9	173.0	151
						245.9	2.8	326.8	1.2	329.0	152
						196.5	8.1	261.8	5.2	273.0	153
							8.4		5.8		154
							0.9		5.5		155
							2.0		6.1		157
							2.5		3.7		156
							4.9		2.6		158
				110.9	0.5	231.8	5.8	316.2	8.0	326.5	159
							2.2		5.9		160
							4.5		5.0		161
				367.3	2.6	449.4	0.4	513.5	5.7	515.0	163
		78.3	2.5	416.4	0.8	496.3	5.0	570.7	7.1	573.0	164
							5.0		5.2		165
						338.3	11.0	426.8	8.5	498.0	166
						197.7	7.1	266.0	4.8	273.0	167
						337.2	2.8	433.5	3.1	535.4	168
				51.8	0.5	164.2	11.2	236.5	6.5	247.0	169
						338.0	5.2	426.0	4.8		170
							5.5	317.0	4.9		171
						146.0	6.6	228.8	6.0	232.0	172
						166.4	1.7	233.5	4.2	242.0	173

Detailed Records in Sandy River District.

Within the borders of Sandy River District (McDowell), 14 borings have been sunk, the most of which were for the purpose of testing the underlying coals. The detailed logs of **Nos. 30, 31, 37, 38 and 39 on Map II** are given in connection with the sections in Chapter IV for Douglas Station, Panther, Harman Branch, Avondale and Bradshaw, respectively. The four following records are from shallow churn-drill borings to test the coal beds on the waters of Panther Creek, in which the **Iaeger bed** appears to be the most important coal:

Coal Test Boring (No. 32 on Map II).

Sandy River District, on Panther Creek, 400 feet above mouth of George Branch; churn-drill boring, by Panther Lumber Co.; authority, W. D. Kroll; elevation, 1135' B.

	Ft.	In.
Sandstone, shale, and slate (no coal to bottom)	110	0

Coal Test Boring (No. 33 on Map II).

Sandy River District, on Panther Creek, at mouth of Slaunch Fork; well by Panther Lumber Co.; authority, W. D. Kroll; elevation, 1235' B.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone	18	0	18	0
Coal, iaeger, to bottom.....	4	6	22	6

Coal Test Boring (No. 35 on Map II).

Sandy River District, on Meathouse Fork at mouth of Bucklick Branch; churn-drill boring by Pocahontas Coal & Coke Co.; authority W. D. Kroll; well starts 20 feet under Iaeger "B" Coal; elevation, 1477' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil, sandstone, and slate.....	82	6	82	6
Coal, clean, iaeger, to bottom.....	4	6	87	0

Coal Test Boring (No. 36 on Map II).

Sandy River District, on Meathouse Fork, at mouth of Vance Fork; churn-drill boring, by Pocahontas Coal & Coke Co.; authority, W. D. Kroll; elevation, 1650' B.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil and sandstone.....	14	0	14	0
Coal, iaeger, to bottom.....	4	6	18	6

Coal Test Boring No. 34 on Map II, located along Slauch Fork of Panther, $\frac{1}{2}$ mile above the mouth of Arrow Branch, in the southwest edge of Sandy River District, was drilled by the Panther Lumber Company, according to W. D. Kroll of Panther, W. Va., but the Survey was unable to obtain any information as to coal and other strata encountered.

The following is the record of a boring in the southern portion of the same district, that starts 25 to 30 feet below the horizon of the Sewell ("Davy") Coal, as determined by the writer. The Sewell-Beckley interval in the Bradshaw Section, page 96, is only 245 feet; hence, the correlation of the bed at a depth of 296 feet with the Fire Creek Coal:

Coal Test Boring (No. 40 on Map II).

Sandy River District, on west bank of Bradshaw Creek, 0.4 mile northeast of mouth of Groundhog Branch; drilled by Clark & Krebs; elevation, 1250' B.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Unrecorded	71	4	71	4
Coal, Welch	1	8	73	0
Unrecorded	78	9	151	9
Coal, Little Raleigh	1	3	153	0
Unrecorded	143	0	296	0
Coal, Fire Creek	4	3	300	3
State				

The Survey was unable to obtain any information concerning **Coal Test Borings Nos. 41 and 42 on Map II** in the same District, on the waters of Bradshaw Creek, the former being located on the north bank of Hite Fork, 175 feet east of its mouth; and the latter, 60 feet south of Bradshaw Creek and 150 feet east of the mouth of Wolfpen Branch. On Clear Fork in the east edge of Sandy River District, $\frac{1}{4}$ mile south of the mouth of Abbcamp Branch, J. W. Dawson of Charleston, W. Va., drilled **Coal Test Boring No. 43 on Map II**. The Survey was unable to obtain this record, but the well mouth belongs slightly over 100 feet below the horizon of the **Sewell Coal**, as determined by **Gawthrop**.

Detailed Records in Browns Creek District.

Browns Creek District, occupying the north central border of McDowell County, has been quite thoroughly prospected with coal borings, 22 tests having been sunk within its boundaries. The detailed records of **Nos. 53 and 61 on Map II** are given in connection with the Cub Branch—Pando and Welch Sections, pages 103 and 105, respectively. In the western edge of the same District, near the head of Lower Hensley Branch, **Coal Test Borings Nos. 44 and 45 on Map II** were drilled by the J. B. B. Coal Co. of Boston, Mass. The detailed logs of these two borings were not obtained, but the depth and thickness of the **Sewell ("Davy") Coal** are exhibited in the table of well records for McDowell County on a preceding page of this Chapter. The fourteen following records are from borings roughly arranged from east to west across the District:

Coal Test Boring (No. 45A on Map II).

Browns Creek District, on north side of Tug Fork, at Hensley; well by Geo. F. Lasher, Trustee; authority, W. R. Graham; completed, March 10, 1903; elevation, 1145' B.

	Thickness	Total	
	Ft. In.	Ft. In.	
Clay and gravel.....	16 0	16 0	
Sandstone, Lower Raleigh	59 0	75 0	
Slate	8 0	83 0	
Coal, soft.....0' 5" }	Beckley.. 1 3	84 3	84' 3"
Slate .....0 4 }			
Coal, soft.....0 6 }	(1060' B.)		
Slate	14 0	98 3	
Sandstone .....31' }	Quinnimont.. 100 0	198 3	
Slate .....5 }			
Sandstone .....64 }			
Limestone?.....	56 0	254 3	
Sandstone, Pineville	79 0	333 3	
Limestone?	2 0	335 3	
Slate	3 0	338 3	
Sandstone	6 0	344 3	
Slate	16 0	360 3	
Sandstone	6 0	366 3	
Slate	22 6	388 9	
Sandstone	3 0	391 9	
Slate	3 6	395 3	
Sandstone	2 0	397 3	
Slate	7 4	404 7	

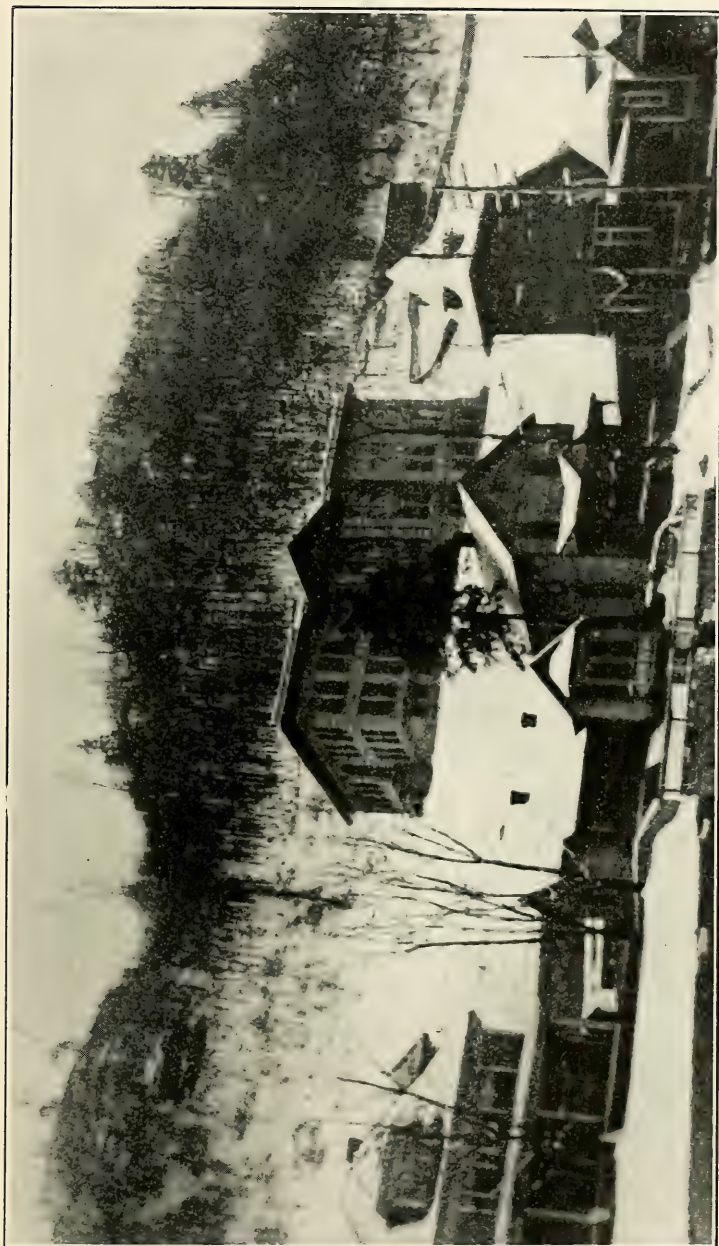


PLATE XIV(a)—Showing public school building at Welch and the outcrop of sandstones of the Pottsville Series.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Conglomerate, Pierpont	95	5	500	0
Slate	34	0	534	0
Sandstone, Eckman	80	0	614	0
Slate	24	0	638	0
Coal, soft, No. 4 Pocahontas	0	10	638	10
Sandstone, Upper Pocahontas	32	0	670	10
Slate	5	6	676	4
Coal, splint, No. 3 Pocahontas (468' B.).....	0	4	676	8
Limestone?	74	0	750	8
Slate	7	0	757	8
Coal, soft, No. 1 Pocahontas	0	11	758	7
Slate	5	0	763	7
Fire clay.....	4	5	768	0
Sandstone, Landgraff , to bottom...	32	0	800	0

554' 7"

37' 10"

81' 11"

The above boring starts 145 feet below the Sewell ("Davy") Coal, as determined with aneroid by the writer, and shows the Beckley ("War Creek") Coal, as also the beds of the Pocahontas Group thinned below minable dimensions.

Coal Test Boring (No. 46 on Map 11).

Browns Creek District, on Hensley Creek, 1 mile north of Claren Station; well No. 4 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1320' B.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	27	0	27	0
Dark blue shale.....	19	5	46	5
Sandstone, Lower Guyandot	10	3	56	8
Sandy shale.....	8	10	65	6
Blue shale.....	3	0	68	6
Black slate.....	0	5	68	11
Coal, Sewell ("Davy") (1249' B.)...	2	3	71	2

Coal Test Boring (No. 47 on Map II).

Browns Creek District, on Huntingshirt Branch, 0.6 mile southwest of Marytown; well by Big Sandy Creek Coal & Coke Co.; authority, H. N. Eavenson; completed, Dec. 8, 1907; elevation, 1204' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	10	0	10	0
Sandstone, hard, Lower Raleigh ...	29	0	39	0
Shale, dark.....	17	0	56	0
Sandstone, Quinnimont	55	0	111	0
Shale, dark.....	2	0	113	0

		Thickness	Total	
		Ft. In.	Ft. In.	
Sandstone	55' } Pineville.	119 0	232 0	
Sandstone, hard....	64 }			
Shale, dark.....		27 0	259 0	
Slate, black.....		5 0	264 0	
Mother Coal, No. 9 Pocahontas....		0 5	264 5	264' 5"
Shale, dark.....		10 0	274 5	
Shale, light.....		7 0	281 5	
Slate, dark.....		14 1	295 6	
Shale, dark.....		8 0	303 6	
Shale, gray, and sandstone.....		30 6	334 0	
Slate, black.....		7 0	341 0	
Coal, trace, and fire clay, No. 8				
Pocahontas		0 6	341 6	77' 1"
Sandstone and shale.....		17 0	358 6	
Conglomer-	} Flattop			
ate ..116' 6"				
Sandstone 12 0	} Mountain.....	128 6	487 0	
	} and Pierpont			
Slate, black.....		19 0	506 0	
Sandstone, hard, Eckman.....		8 0	514 0	
Shale, light.....		20 0	534 0	
Slate, black, and shale.....		20 0	554 0	
Fire clay, No. 4 Pocahontas Coal				
horizon		1 0	555 0	
Shale, light, and shale, black.....		15 0	570 0	
Fire clay.....		4 0	574 0	
Shale, light.....		8 0	582 0	
Sandstone, Upper Pocahontas,				
streaked with coal.....		39 0	621 0	
Coal	0' 5 " }			
Fire clay shale....	1 7 }			
Slate, coal streaks	0 7 }			
Fire clay, slaty...	1 5 }			
Slate, black.....	6 0 }			
Coal, dirty.....	0 2 }			
Binder	0 3½ }			
Coal	0 1½ }			
Fire clay.....	2 8 }			
Coal, clean.....	0 6½ }			
Fire clay.....	0 6½ }			
Coal	0 4 }			
Fire clay, slaty.....		2 0	637 8	
Slate, light.....		25 0	662 8	
Shale and slate.....		8 4	671 0	
Coal, No. 2 Pocahontas, (532' L.)..		0 7	671 7	35' 11"
Fire clay.....		2 5	674 0	
Sandstone, hard, and shale.....		10 0	684 0	

The above boring starts 120 feet below the Welch Coal.

Coal Test Boring (No. 48 on Map II).

Browns Creek District, on head of Lower Twin Branch, 1.7 miles northward from Marytown; well No. 2 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1521' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface (casing).....	18	7	18	7
Dark shale.....	12	6	31	1
Black slate.....	0	5	31	6
Slaty coal.....	0	2	31	8
Light shale.....	0	6	32	2
Sandstone .....33' 2" }	73	7	105	9
Sandy shale..... 6 2 { Guyandot.				
Sandstone and shale partings 34 3 }				
Dark sand shale and limestone partings	7	0	112	9
Sandy shale.....	9	9	122	6
Dark sand shale and limestone partings	16	0	138	6
Dark shale.....	15	5	153	11
Sandstone	49	1	203	0
Dark blue shale and limestone partings	22	0	225	0
Dark sand shale.....	16	9	241	9
Dark shale and limestone partings.	11	8	253	5
Slate and coal partings .....0' 2" }	2	1	255	6
Coal (1255' L.)...1 11 { Sewell ("Davy").				
Slaty shale.....	0	6	256	0
Dark shale.....	4	0	260	0
Sand shale.....	1	6	261	6

Coal Test Boring (No. 49 on Map II).

Browns Creek District, near head of Upper Twin Branch, 2¼ miles northwest of Davy; well No. 3 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1493' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface (casing).....	23	6	23	6
Sandy shale.....	27	6	51	0
Dark blue shale and limestone partings	18	6	69	6
Dark sandy shale.....	4	6	74	0
Sandstone	58	9	132	9
Dark blue shale.....	21	3	154	0
Limy shale.....	4	0	158	0
Dark shale and limestone partings	4	0	162	0
Sandy shale.....	26	8	188	8

	Thickness Ft. In.	Total Ft. In.
Coal .....2' 1½"	Sewell ("Davy"). (1300' L.)	4 5
Soft shale and coal part- ings .....0 7½		
Hard slate.....0 7½		
Soft shale and coal part- ings .....0 3½		
Hard slate.....0 3		
Soft shale and coal part- ings .....0 4		
Slaty coal.....0 2		
Dark shale.....	2 4	195 5
Hard sand shale.....	1 6	196 11
Sandstone, Welch.....	0 4	197 3

Coal Test Boring (No. 50 on Map II).

Browns Creek District, on head of Upper Twin Branch, 2½ miles due north of Davy; well No. 4 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1692' L.

	Thickness Ft. In.	Total Ft. In.	
Surface	16 0	16 0	
Sandstone	22 0	38 0	
Shale, sandstone partings.....	21 6	59 6	
Blue slaty shale.....	19 6	79 0	79' 0"
Sandstone .....42' 3"	Guyandot.	85 8	164 8
Sand shale.... 0 6			
Blue shale.... 3 3			
Sandy shale.... 18 0			
Sandstone, shale parting 21 8			
Sandy shale.....	15 10	180 6	
Blue slaty shale.....	22 4	202 10	
Sand shale.....	6 0	208 10	
Slate	0 4	209 2	
Sand shale.....	0 2	209 4	
Coal, bone and slate 0' 4"	Sewell "B"	0 8½	210 0½
Coal 0 1			
Bone coal.... 0 0½			
Coal 0 3			
Slate	0 2	210 2½	
Sand shale.....	7 3½	217 6	
Sandstone	32 6	250 0	
Sand shale	1 0	251 0	
Dark sandy shale.....	16 0	267 0	
Bone coal, Sewell "A".....	0 4	267 4	57' 3½"
Sandstone, Lower Guyandot.....	23 8	291 0	
Sandy shale, lime parting.....	16 0	307 0	

		Thickness		Total			
		Ft.	In.	Ft.	In.		
Blue shale.....		1	0	308	0		
Coal, Sewell, "Davy" (1382' L.)....		3	2	311	2	43' 10"	
Soft slate.....		0	4	311	6		
Sandy shale.....		2	6	314	0		
Sandstone, shale	}						
parting 23' 0"							
Hard sandstone.. 16 0							
Sandstone, shale							
parting 2 0	Welch.						
Hard sandstone.. 29 6				387 0			
Sandstone, shale							
parting 2 6	}						
Sand shale.....		1	1	388	1		
Coal 0' 10½"							
Bone coal..... 0 2½							
Coal 0 2¾	Welch.						
Slate 0 1½				390 5¼		79' 3¼"	
Coal 0 11							
Fire clay.....		0	7¾	391	1		

Coal Test Boring (No. 51 on Map II).

Browns Creek District, on head of Left Fork of Davy Branch, 2 miles northward from Davy; well No. 5 by J. B. B. Coal Co.; authority, Timothy W. Sprague, Boston, Mass.; elevation, 1607' L.

		Thickness		Total			
		Ft.	In.	Ft.	In.		
Surface		26	0	26	0		
Blue shale.....		10	0	36	0		
Sandstone	} Guyandot						
Hard sandstone.... 44' 4		48	0	84	0	84' 0"	
Blue shale.....		18	1	102	1		
Sand shale.....		27	9	129	10		
Sand shale with lime parting.....		22	0	151	10		
Black slate.....		0	2	152	0		
Coal 2' 10"	} Sewell						
Slaty shale with							
coal parting.. 3 2							
Coal 0 6	"Davy"						
Dark shale.....		0	9	158	6	74' 6"	
Sandstone		1	9	159	3		
				161	0		

Coal Test Boring (No. 52 on Map II).

Browns Creek District, on Davy Branch, 0.6 mile northeast of Davy; well by Superior Pocahontas Coal Co.; authority, W. R. Graham; elevation, 1245' L.

		Thickness		Total			
		Ft.	In.	Ft.	In.		
Casing		12	0	12	0		
Sandstone, hard.....		3	0	15	0		
Coal, Beckley, "War Creek".....		1	11	16	11	16' 11"	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Fire clay.....	0	6	17	5	
Shale, dark.....	30	0	47	5	
Sandstone, Quinnimont	59	0	106	5	
Slate, dark.....	0	3	106	8	
Coal, Fire Creek	2	4	109	0	92' 1"
Fire clay.....	0	6	109	6	
Shale, dark.....	1	6	111	0	
Shale and sandstone partings....	17	0	128	0	
Sandstone, hard.....	10	0	138	0	
Sandstone and shale partings....	21	0	159	0	
Black slate and coal, Little Fire Creek	4	0	163	0	54' 0"
Shale, blue.....	40	0	203	0	
Sandstone, hard, and shale.....	102	0	305	0	
Sandstone, hard, Flatop and Pierpont	140	0	445	0	
Sandstone and shale partings....	15	0	460	0	
Sandstone, Eckman	73	0	533	0	
Shale, sandy.....	10	0	543	0	
Shale, dark.....	7	6	550	6	
Coal 0' 4" }					
Slate 0 1 }					
Coal 0 2 { No. 4 Pocahontas	5	3	555	9	392' 9"
Shale, dark 0 2 {					
Shale, sandy 4 0 }					
Coal 0 6 }					
Fire clay.....	2	0	557	9	
Shale, light.....	2	0	559	9	
Sand shale.....	12	3	572	0	
Sandstone, Upper Pocahontas	39	0	611	0	
Shale, dark.....	0	2	611	2	
Sandstone	0	1	611	3	
Shale, dark.....	0	1	611	4	
Coal 0' 5" }					
Shale, dark 0 6 }					
Coal 0 5 }					
Shale, dark 3 9 }					
Coal and bone 0 2 { No. 3 Pocahontas	11	1	622	5	66' 8"
Shale, dark 0 1 }					
Coal and bone 0 10 }					
Slate, dark 0 2 }					
Coal 0 5 }					
Slate and fire clay .. 2 6 }					
Coal 0 6 }					
Slate 0 11 }					
Coal 0 5 }					
Fire clay	2	7	625	0	
Shale, light.....	10	0	635	0	
Shale, blue.....	11	10	646	10	
Slate, black.....	0	2	647	0	
Coal, No. 2 Pocahontas	0	3	647	3	24' 10"
Shale, light.....	0	9	648	0	
Sandstone and shale partings....	38	6	686	6	
Shale, sandy.....	3	6	690	0	

	Thickness		Total	
	Ft.	In.	Ft.	
Shale, dark.....	23	6	713	6
Slate, black, North Fork?.....	2	3	715	9
Coal and bone, Simmons?.....	0	8	716	5
Sandstone	0	7	717	0
Shale, dark.....	3	6	720	6
Fire clay.....	9	6	730	0
Shale, light, sandy.....	14	6	744	6
Shale, red, top of Mauch Chunk Series	2	0	746	6
Shale, green, to bottom.....	1	6	748	0

69' 2"

The above boring starts 205 feet below the Sewell ("Davy") Coal at Mine 43 on Map II, as determined with hand-level by the writer; hence, the coal at 15 feet in depth undoubtedly represents the Beckley or "War Creek" bed. The entire Pocahontas Group is penetrated by this boring, the base of which comes only 122 feet below the No. 3 Pocahontas Coal. The latter seam, as also No. 4 Pocahontas, is so split up with slate partings as to render it worthless in this region.

Coal Test Boring (No. 54 on Map II).

Browns Creek District, mouth of Shannon Branch, at Farm, on Big Sandy Creek Coal & Coke Co. property; well No. 1 by Tug River Coal & Land Co.; authority, H. N. Eavenson; elevation, 1295.4' L.

	Thickness		Total	
	Ft.	In.	Ft.	
Soil and boulders.....	6	0	6	0
Sandstone, Pineville.....	28	8	34	8
Coal, No. 5 Pocahontas.....	1	1	35	9
Fire clay.....	2	6	38	3
Shale rock and sand rock.....	15	6	53	9
Sandstone	11	6	65	3
Shale	0	6	65	9
Sandstone	17	3	83	0
Shale and sandstone.....	3	6	86	6
Coal, No. 7 Pocahontas.....	0	8	87	2
Fire clay.....	2	4	89	6
Shale, light.....	3	6	93	0
Sandstone	40	4	133	4
Shale	31	3	164	7
Coal, No. 6 Pocahontas.....	0	4	164	11
Shale, sandy.....	46	5	211	4
Sandstone	91	2	302	6
Sandstone and coal.....	21	0	323	6
Coal, No. 4 Pocahontas.....	0	4	323	10
Sand, coal, and rock.....	11	9	335	7
Shale, sandy.....	14	6	350	1
Shale	19	11	370	0

35' 9"

51' 5"

77' 9"

158' 11"

		Thickness	Total	
		Ft. In.	Ft. In.	
Coal	1' 2"	No. 3 Pocahontas (921' L.)	374 7	50' 9"
Bone	0 3			
Coal	3 2			
Fire clay, dark		0 9	375 4	
Shale, light		15 10	391 2	
Sandstone, streaked		5 0	396 2	
Shale, sandy		19 7	415 9	
Coal	0' 4"	No. 2 Pocahontas	421 11	47' 4"
Shale, soft	5 6			
Coal	0 4			
Shale		6 1	428 0	
Sandstone		5 0	433 0	
Shale, soft		5 0	438 0	
Sandstone		7 0	445 0	
Shale, to bottom		9 0	454 0	

Coal Test Boring (No. 56 on Map II).

Browns Creek District, on Shannon Branch, 1 mile N. 10° E. of Farm; well by Standard Pocahontas Coal Co.; authority, G. J. Cooper; elevation, 1481' L.

		Thickness	Total	
		Ft. In.	Ft. In.	
Surface, gravel		22 6	22 6	
Sandstone, Quinnimont		32 0	54 6	
Sand shale		3 6	58 0	
Sandstone	37'	Pineville and Flat top Moun- tain	227 0	285 0
Sandstone and shale partings	55			
Sandstone, hard	135			
Coal, No. 7 Pocahontas		0 6	285 6	285' 6"
Fire clay		0 6	286 0	
Shale, light, sandy		7 0	293 0	
Shale, blue		17 0	310 0	
Sandstone, Pierpont		30 0	340 0	
Sandy shale		30 0	370 0	
Shale, dark		9 0	379 0	
Slate, black		0 6	379 6	
Coal, No. 6 Pocahontas		1 8	381 2	95' 8"
Fire clay		2 0	383 2	
Shale, light, sandy		4 0	387 2	
Shale, blue		3 0	390 2	
Sandstone, Eckman		60 0	450 2	
Sandstone, shale partings		4 0	454 2	
Shale, dark		10 0	464 2	
Slate, black		0 8	464 10	
Coal, No. 5 Pocahontas		0 2	465 0	83' 10"
Fire clay		1 0	466 0	
Shale, light, sandy		5 0	471 0	
Sandstone		36 0	507 0	
Coal, No. 4 Pocahontas		2 6	509 6	44' "
Fire clay		1 3	510 9	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Slate, dark.....	2	3	513	0	
Sand shale.....	10	0	523	0	
Sandstone, with shale streaks.....	5	0	528	0	
Bone	0	1	528	1	
Shale, dark.....	0	8	528	9	
Sandstone, with shale streaks, Up- per Pocahontas.....	18	3	547	0	
Shale, dark.....	19	0	566	0	
Shale, black.....	0	6	566	6	
Coal .....0' 2 "	} No. 3 Pocahontas (909.25' L.)	5	571	9½	62' 3½"
Slate, black 0 4					
Coal .....1 6					
Bone .....0 2½					
Coal .....3 1					
Fire clay to bottom.....	1	2½	573	0	

The above boring starts 240 feet below an opening in the Sewell ("Davy") Coal, as determined with aneroid by Gawthrop.

Coal Test Boring (No. 59 on Map II).

Browns Creek District, on south side of Browns Creek, 1.2 miles northeast of Welch, on Bouvier Tract; well by Central Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1378' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sandstone, Flat top Mountain	90	4	90	4	
Coal, slaty, No. 7 Pocahontas	0	9	91	1	91' 1"
Sandstone and slate.....	157	2½	248	3½	
Coal 1' 0"	} No. 4 Pocahontas	4	253	0	161' 11"
Bone 0 1½					
Coal 3 7					
Slate and sandstone.....	57	10½	310	10½	
Coal 1 6½"	} No. 3 Pocahontas	4	315	2½	62' 2½"
Bone ... 0 2½					
Coal 2 7					
Sandstone and shale.....	27	5½	342	8	
Coal, No. 2 "A" Pocahontas	1	9	344	5	29' 2½"

Coal Test Boring (No. 60 on Map II).

Browns Creek District, on south side of Browns Creek, 1.4 miles north of Olmsted; well by Pulaski Iron Co.; authority, H. N. Eavenson; elevation, 1571' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sand and boulders.....	7	6	7	6
Sandstone, Pineville , upper division	51	0	58	6

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Shale, sandy.....	19	7	78	1	
Shale, blue.....	1	6	79	7	
Slate, black.....	0	1	79	8	
Coal, Little Fire Creek.....	0	5	80	1	80' 1"
Slate, black.....	0	1	80	2	
Fire clay.....	1	10	82	0	
Sandstone, Pineville, lower division	49	6	131	6	
Shale, light.....	5	3	136	9	
Coal 0' 3" }					
Shale ... 0 6 }					
Coal 0 1 }					
Shale ... 0 2 } No. 9 Pocahontas	2	0	138	9	58' 8"
Coal 0 1 }					
Slate 0 6 }					
Coal 0 5 }					
Fire clay.....	5	0	143	9	
Shale	30	0	173	9	
Shale, sandy.....	12	0	185	9	
Coal, No. 8 Pocahontas.....	0	7	186	4	47' 7"
Fire clay.....	0	6	186	10	
Shale, blue.....	4	6	191	4	
Shale, sandy.....	3	6	194	10	
Sandstone, Flattop Mountain.....	49	7	244	5	
Shale, sandy..... 30' 1" } Rift....	31	1	275	6	
Shale, dark..... 1 0 }					
Coal, No. 7 Pocahontas.....	0	5	275	11	89' 7"
Shale, sandy.....	20	0	295	11	
Slate and coal ... 0' 2" } Split off					
Coal 1 0 } No. 7.....	1	2	297	1	21' 2"
Slate	1	7	298	8	
Sandstone, Pierpont.....	18	0	316	8	
Coal 0' 10" }					
Slate, with coal } No. 6					
partings 0 10 } Pocahontas..	1	8	318	4	21' 3"
Shale, dark.....	1	3	319	7	
Sandstone, Eckman.....	52	5	372	0	
Slate, with coal partings, No. 5					
Pocahontas	1	6	373	6	
Shale, sandy.....	2	2	375	8	
Sandstone	57	11	433	7	
Coal 0' 6 " }					
Sulphur band.. 0 0½ }					
Coal 1 4½ }					
Slate 0 0½ } No. 4	4	10½	438	5½	120' 1½"
Coal 1 7¼ } Pocahon-					
Slate 0 1¼ } tas.					
Coal 1 2½ }					
Fire clay.....	3	10½	442	4	
Shale, sandy.....	35	5	477	9	
Sandstone, Upper Pocahontas.....	17	1	494	10	
Slate, black.....	5	0	499	10	

			Thickness	Total	
			Ft. In.	Ft. In.	
Coal	.....0' 2"	No. 3 Pocahontas.... (1064.8" L.)	6 3	506 1	67' 7½"
Slate	.....0 8				
Coal	.....1 10				
Bone	.....0 3				
Coal	.....0 11				
Bone	.....0 1				
Coal	.....2 4				
Slate to bottom	.....		0 5	506 6	

Coal Test Boring (No. 62 on Map II).

Browns Creek District, on south side of Elkhorn Creek, 0.9 mile east of Welch; well by Pulaski Iron Co.; authority, H. N. Eavenson; well completed February 15, 1913; elevation, 1310' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface	26	0	26	0	
Shale, dark, sandy.....	29	0	55	0	
Shale, dark.....	1	3	56	3	
Sandstone	8	3	64	6	
Shale, dark, sandy.....	1	0	65	6	
Sandstone, Pierpont	50	8	116	2	
Slate	1	0	117	2	
Sandstone	29	0	146	2	
Slate	2	0	148	2	
Sandstone	12	6	160	8	
Slate, dark.....	3	0	163	8	
Sandstone, broken, Eckman	57	10	221	6	
Shale, sandy.....	4	9	226	3	
Coal, No. 4 Pocahontas, (1078.6' L.)	5	2	231	5	231' 5"
Fire clay.....	2	9	234	2	
Shale, sandy.....	15	1	249	3	
Sandstone, soft.....	2	7	251	10	
Shale, sandy.....	10	3	262	1	
Slate, dark.....	0	2	262	3	
Shale, sandy.....	9	3	271	6	
Sandstone	1	0	272	6	
Shale, sandy.....	10	2	282	8	
Slate	4	0	286	8	
Coal .....0' 3"	} No. 3 Pocahontas	6 1	292 9	61' 4"	
Slate .....0 7					
Coal .....1 9					
Bone .....0 1					
Coal .....1 1					
Bone .....0 1					
Coal .....2 3					
Fire clay.....	0	3	293	0	

Coal Test Boring (No. 63 on Map II).

Browns Creek District, on north side of Elkhorn Creek, $\frac{1}{2}$ mile west of Olmsted, on Bouvier-Iaeger Tract; well by Pulaski Iron Co.; authority, H. N. Eavenson; elevation, 1317' L.

		Thickness		Total	
		Ft.	In.	Ft.	In.
Surface and boulders.....		15	7	15	7
Shale, sandy.....		1	0	16	7
Shale, dark.....		8	0	24	7
Coal, No. 7 Pocahontas.....		0	7	25	2
Fire clay.....		2	0	27	2
Sandstone, Pierpont and Eckman..		163	11	191	1
Coal .....0' 2"	} No. 4				
Slate .....0 1		4	1	195	2
Coal .....3 10					
Sandstone and coal partings.....		0	10	196	0
Shale, sandy.....		35	5	231	5
Sandstone and shale partings.....		18	9	250	2
Shale, light.....		6	6	256	8
Shale, dark.....		0	8	257	4
Slate with small coal partings.....		3	0	260	4
Coal ...1' 11 "	} No. 3				
Bone ...0 1½					
Coal ...1 0		5	3	265	7
Bone ...0 0½					
Coal ...2 2					
Slate, black.....		0	0½	265	7½
Shale, sandy, to bottom.....		22	4½	288	0

The Survey was unable to obtain the logs of **Coal Test Borings Nos. 55 and 57 on Map II** in the same District, the former being located at the mouth of Upper Shannon Branch; and the latter, on Shannon Branch, 1.6 miles northeast of Farm. The detailed log of **Coal Test Boring No. 58 on Map II**, located at the mouth of Browns Creek, $\frac{1}{2}$ mile northwest of Welch, is published on page 620 of Volume II of the State Geological Survey Reports. **Boring No. 64 on Map II**, located on the north bank of Elkhorn Creek and 60 feet west of Mill Creek, and sunk with churn-drill by the Huston Collieries Co. for water during 1914, encountered $4\frac{1}{2}$ feet of the No. 4 Pocahontas Coal at a depth of 195 feet, and when visited by the writer had not reached the No. 3 Pocahontas bed.

Detailed Records in Big Creek District.

Big Creek District, occupying the southern central border of McDowell County, has also been quite thoroughly pros-

pected with coal test borings, a total of 66 having been drilled within its boundaries and two others—Nos. 131 and 132 on Map II—in the immediately adjoining portion of Tazewell County, Virginia. The detailed records of **Nos. 75, 97, 103, 114, 120, 126 and 130 on Map II** are published in connection with the general sections for Coalwood—1.4 Miles Northeast, Bearwallow Knob—2 Miles East, Head of Vall Creek, Berwind— $\frac{1}{2}$ Mile Northeast, Jacob Fork—1.2 Miles North of Mouth, Mouth of Long Branch, and Mouth of Horsepen Creek, pages 108, 119, 117, 116, 112, 114, and 121, respectively. As shown in the page references in the following table, the logs of three others have been published in Volume II(A) of the State Geological Survey Reports, the correlations of the coal beds in each being accurate:

**List of Big Creek District Borings Published in Other
State Reports.**

No. on Map II	LOCATION	Page of Vol. II(A).
125	On Big Creek, 0.6 mi. N. W. of mouth of Long Branch	111
129	On Turkeywing Branch, 1.7 mi. N. W. of Filbert.....	110
132	In Virginia, 1.6 mi. N. E. of Horsepen.....	106

The depths and thicknesses of the Nos. 3 and 4 Pocahontas Coals in the above borings are also given on a preceding page of this Report in the table of well records for McDowell County.

The detailed records of 47 coal test borings at scattered points in Big Creek District will now be given, the name of the company and authority for the log being published along with the heading for each. These contain invaluable information as to the thickness and character of the coals, and also corroborate the General Section of the Pottsville Measures, pages 51-60.

Coal Test Boring (No. 65 on Map II).

Big Creek District, on Daycamp Branch, 2.2 miles northwest of Coalwood; well by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1456.83' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface	17	0	17	0	
Sandstone, Upper Raleigh.....	14	0	31	0	
Slate	1	0	32	0	
Sandstone	6	0	38	0	
Slate	1	0	39	0	
Sandstone, Upper Raleigh.....	17	6	56	6	
Coal, Little Raleigh.....	1	6	58	0	58' 0"
Shale, gray.....	3	0	61	0	
Shale, sandy.....	34	6	95	6	
Coal, Beckley.....	2	6	98	0	40' 0"
Shale, sandy.....	5	0	103	0	
Sandstone	6	0	109	0	
Shale, sandy.....	3	0	112	0	
Sandstone	13	0	125	0	
Shale, sandy.....	5	0	130	0	
Slate	17	0	147	0	
Sand shale.....	5	0	152	0	
Sandstone	22	0	174	0	
Shale, sandy.....	10	0	184	0	
Sandstone	2	0	186	0	
Coal, Fire Creek.....	1	9	187	9	89' 9"
Sandstone	12	3	200	0	
Slate	5	0	205	0	
Sandstone	37	0	242	0	
Coal, Little Fire Creek.....	0	8	242	8	54' 11"
Sandstone	7	4	250	0	
Slate	6	0	256	0	
Sandstone, Pineville.....	39	0	295	0	
Slate	5	0	300	0	
Coal	0	4	300	4	57' 8"
Slate	2	8	303	0	
Sandstone, hard, Pineville.....	123	6	426	6	
Coal, No. 8 Pocahontas.....	0	6	427	0	126' 8"
Slate	5	0	432	0	
Sandstone .....13	} Flattop Mountain.	74	6	506	6
Sandstone, broken. 5					
Sandstone, hard...46					
Sandstone, hard, broken .....10.5					
Coal .....1' 3"	} No. 7	2	0	508	6
Slate .....0 5					
Coal .....0 4					
Slate	9	6	518	0	
Sandstone .....48'	} Pierpont..	71	0	589	0
Sandstone, broken..23					
Sandstone	0	6	589	6	
Coal, No. 6 Pocahontas.....	0	6	590	0	81' 6"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone	6	0	596	0
Slate	1	0	597	0
Fire clay.....	4	0	601	0
Slate	22	0	623	0
Sandstone	13	0	636	0
Slate	0	8	636	8
Fire clay.....	7	4	644	0
Slate	0	4	644	4
Coal, No. 5 Pocahontas.....	1	2	645	6
Slate	26	8	672	2
Coal, No. 4 Pocahontas.....	4	7	676	9
Slate	24	3	701	0
Sand shale.....	10	0	711	0
Slate	15	2	726	2
Coal, No. 3 Pocahontas.....	1	8	727	10
Fire clay.....	2	0	729	10
Shale, sandy.....	58	0	787	10
Sandstone, Vivian.....	21	0	808	10
Slate	0	6	809	4
Coal, No. 1 Pocahontas.....	0	4	809	8
Slate	5	2	814	10
Sandstone, Landgraaf.....	8	0	822	10
Slate, gray, to bottom.....	5	0	827	10

55' 6"

31' 3"

51' 1"

81' 10"

The above boring starts 115 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 66 on Map II).

Big Creek District, on Clear Fork, 0.3 mile below mouth of Big Branch and 3 miles northwest of Coalwood; well by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1349.8' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	18	0	18	0
Slate	38	0	56	0
Coal, Beckley.....	2	4	58	4
Slate, sandy.....	19	9	78	1
Sandstone	14	2	92	3
Slate, sandy.....	9	11	102	2
Slate	15	9	117	11
Sandstone, slaty.....	9	0	126	11
Sandstone, with shale streaks....	10	4	137	3
Sandstone	8	0	145	3
Shale, sandy.....	15	0	160	3
Slate, with gray rock bands.....	7	0	167	3
Coal, Fire Creek.....	4	0	171	3
Shale, gray.....	8	0	179	3
Sandstone	10	0	189	3
Shale, sandy.....	3	0	192	3
Sandstone	3	6	195	9
Coal and shale.....	0	6	196	3
Shale, gray.....	2	0	198	3

58' 4"

112' 11"

25' 0"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone	8	0	206	3
Sandstone, white, and shale.....	4	0	210	3
Shale, gray.....	1	0	211	3
Coal .....1' 0" } Little Fire				
Shale, black...2 6 } Creek.....	4	0	215	3
Coal .....0 6 }				
Shale, gray.....	1	0	216	3
Sandstone	20	0	236	3
Sandstone, with shale.....	7	0	243	3
Sandstone	8	0	251	3
Shale, sandy.....	3	0	254	3
Coal, local.....	2	0	256	3
Rock, gray.....	3	0	259	3
Sandstone	2	0	261	3
Sandstone, dark.....	13	0	274	3
Shale, dark, with gray rock bands	4	0	278	3
Coal, No. 9 Pocahontas.....	1	6	279	9
Sandstone	28	6	308	3
Slate	1	1	309	4
Coal, No. 8 Pocahontas.....	0	11	310	3
Shale	1	0	311	3
Sandstone, Flattop Mountain.....	45	0	356	3
Coal and shale 1' 6" } No. 7				
Coal .....1 0 } Pocahontas..	3	0	359	3
Coal and shale 0 6 } (990.6' L.)				
Rock, gray.....	4	0	363	3
Sandstone	11	0	374	3
Shale	5	0	379	3
Sandstone	6	0	385	3
Shale	6	0	391	3
Sandstone 8' } Pierpont.....	41	0	432	3
Sandstone, hard..33 }				
Shale, sandy.....	2	0	434	3
Slate	2	4	436	7
Coal .....1' 8" } No. 6				
Slate .....0 6 } Pocahontas....	2	8	439	3
Coal .....0 6 }				
Slate	3	0	442	3
Sandstone	12	0	454	3
Sand shale.....	27	0	481	3
Sandstone	45	0	526	3
Sandstone, with coal seams.....	2	0	528	3
Sandstone	27	0	555	3
Shale, hard.....	7	0	562	3
Coal, No. 5 Pocahontas.....	1	1	563	4
Slate	2	0	565	4
Sandstone	3	11	569	3
Slate, with hard brown bands.....	9	0	578	3
Shale, gray, sandy.....	7	0	585	3
Sandstone, with shale.....	16	0	601	3
Sandstone	2	3	603	6

			Thickness Ft. In.	Total Ft. In.	
Coal	.....3' 8"	} No. 4 Pocahontas.... (742.2' L.)			
Slate	.....0 3		4 1	607 7	44' 3"
Coal	.....0 2				
Shale, gray	.....		2 8	610 3	
Slate	.....		2 0	612 3	
Shale, sandy, to bottom	.....		2 0	614 3	

The above boring starts 180 feet below the Sewell Coal horizon.

Coal Test Boring (No. 67 on Map II).

Big Creek District, on west side of Big Branch, 2.7 miles N. 80° W. of Coalwood, on Mark Packard property; well drilled by Lace Meadows; authority, G. J. Cooper, Welch, W. Va.; elevation, 1410' B.

			Thickness Ft. In.	Total Ft. In.	
Sandstone and boulders	.....		22 6	22 6	
Sandstone, Upper Raleigh	.....		19 6	42 0	
Shale, black	.....		0 4	42 4	
Coal	.....0' 5"	} Little Raleigh.	0 7	42 11	42' 11"
Bone	.....0 2				
Shale, light	.....		2 6	45 5	
Shale, sandy	.....		1 1	46 6	
Sandstone	.....		18 6	65 0	
Coal, Little Raleigh	.....		0 8	65 8	22' 9"
Fire clay	.....		0 4	66 0	
Shale, light, sandy	.....		4 0	70 0	
Shale, partly sandstone	.....		29 6	99 6	
Sandstone, shale partings	.....		1 0	100 6	
Sandstone	.....		2 2	102 8	
Shale, blue	.....		0 6	103 2	
Slate, black	.....		0 4	103 6	
Coal, Beckley, "War Creek"	.....		1 9	105 3	39' 7"
Shale, dark	.....		1 9	107 0	
Sandstone, shale partings	.....43'	} Quinnimont..			
Sandstone	.....18		83 0	190 0	
Sandstone, shale partings	.....22				
Shale, sandstone	.....		20 9	210 9	
Slate, black	.....		0 2	210 11	
Coal	.....0' 6"	} Fire Creek			
Slate	.....0 3		6 2	217 1	111' 10"
Coal	.....4 4				
Slate, black	.....0 9				
Coal	.....0 4				
Fire clay	.....		1 0	218 1	

Coal Test Boring (No. 69 on Map II).

Big Fork District, on fork of Big Branch, 1.9 miles southwest of Coalwood; well No. 6 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1648' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Soil and subsoil.....	4 0	4 0	
Sandstone .....26' }			
Sandstone, broken, blue,			
hard .....17' } Welch	62 0	66 0	
Sandstone, broken,			
dark .....19' }			
Shale, gray.....	1 6	67 6	
Coal, marker, Welch.....	1 6	69 0	69' 0"
Shale, variegated.....	6 0	75 0	
Sandstone, broken, Upper Raleigh..	39 0	114 0	
Coal, with streaks of sandstone...	6 0	120 0	51' 0"
Shale, gray.....	20 0	140 0	
Sandstone, dark, hard.....	30 0	170 0	
Slate, black.....	5 0	175 0	
Coal, Little Raleigh.....	2 0	177 0	57' 0"
Shale, variegated.....	1 0	178 0	
Sandstone, dark, broken, Lower Ra-			
leigh	80 0	258 0	
Coal, Beckley.....	2 0	260 0	83' 0"
Fire clay, flinty.....	6 0	266 0	
Shale, gray.....	30 0	296 0	
Sandstone, Quinnimont.....	35 0	331 0	
Shale, gray.....	5 0	336 0	
Sandstone	7 0	343 0	
Slate, dark.....	7 0	350 0	
Coal .....0' 6" }			
Slate, dark.....1 0' } Fire Creek	2 6	352 6	92' 6"
Coal .....1 0' }			
Slate, black.....	0 6	353 0	
Shale, gray.....	6 0	359 0	
Sandstone	48 0	407 0	
Coal, Little Fire Creek.....	1 6	408 6	56' 0"
Shale, gray.....	6 6	415 0	
Sandstone	12 0	427 0	
Shale, gray.....	10 0	437 0	
Shale, sandy.....	18 0	455 0	
Sandstone, broken.....	10 0	465 0	
Sandstone, brown, Pineville.....	38 0	503 0	
Coal, No. 9 Pocahontas.....	0 8	503 8	95' 2"
Clay and shale, mixed.....	4 4	508 0	
Shale, sandy.....	2 0	510 0	
Sandstone, white quartz.....	26 0	536 0	
Shale, gray.....	16 0	552 0	
Sandstone, Flatop Mountain.....	51 0	603 0	
Slate, gray.....	32 0	635 0	
Sandstone, Pierpont.....	45 0	680 0	
Coal, No. 6 Pocahontas.....	0 6	680 6	176' 10"
Shale, gray.....	18 6	699 0	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone, brown, Eckman	25	6	724	6
Coal , marker.....	0	6	725	0
Sandstone, brown.....	16	0	741	0
Fire clay, flinty.....	3	0	744	0
Sandstone, brown.....	26	0	770	0
Slate, gray.....	4	0	774	0
Coal .....0' 8" }				
Shale, carbon- iferous ...0 1 }				
Coal .....1 0 }				
Bone, hard....0 4 }				
Coal , streaked with bone.3 3 }				
Clay and shale mixed.....				
		No. 4		
		Pocahontas..	5 4	779 4
		(868.7' L.)		98' 10"

The above boring starts 22' below the Sewell ("Davy") Coal, as determined with hand-level by Gawthrop.

Coal Test Boring (No. 70 on Map II).

Big Creek District, on Clear Fork, 0.2 mile west of mouth of Jim Branch; well by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1439' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	23	0	23	0
Sandy shale.....	4	8	27	8
Coal , Beckley	0	8	28	4
Fire clay.....	1	0	29	4
Sandstone, Quinnimont	70	0	99	4
Sandy shale.....	5	0	104	4
Sandstone, white.....	20	0	124	4
Shale, sandy.....	2	0	126	4
Coal .....3' 2" }				
Slate .....0 6 }				
Coal , slaty..0 4 }				
Slate	4	0	134	4
Sandstone	16	0	150	4
Slate	16	0	166	4
Coal , Little Fire Creek	1	4	167	8
Fire clay.....	1	8	169	4
Slate	5	0	174	4
Sandstone, Pineville	32	0	206	4
Shale, sandy.....	3	0	209	4
Sandstone	15	0	224	4
Slate	2	0	226	4
Sandstone	1	0	227	4
Slate	1	0	228	4

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone, Pineville.....	58	0	286	4
Fire clay.....	2	0	288	4
Sandstone.....	7	0	295	4
Shale, sandy.....	7	0	302	4
Slate.....	8	0	310	4
Sandstone.....	5	0	315	4
Sandstone, broken.....	17	0	332	4
Slate.....	9	0	341	4
Fire clay.....	11	0	352	4
Sandstone.....	3	0	355	4
Slate.....	6	0	361	4
Sandstone.....	20	0	381	4
Slate.....	39	0	420	4
Sandstone ... 7' } Flat top Mountain	28	0	448	4
Sandstone, broken ... 21 }				
Fire clay.....	1	0	449	4
Sandstone.....	2	0	451	4
Slate.....	1	6	452	10
Sandstone.....	10	6	463	4
Slate.....	6	0	469	4
Shale, sandy.....	6	0	475	4
Sandstone.....	9	0	484	4
Slate.....	7	0	491	4
Sandstone, Eckman.....	21	0	512	4
Slate.....	13	0	525	4
Sandstone.....	5	0	530	4
Coal, No. 6 Pocahontas.....	0	4	530	8
Shale, sandy.....	29	8	560	4
Shale.....	5	0	565	4
Shale, sandy.....	16	0	581	4
Slate.....	10	2	591	6
Coal, No. 4 Pocahontas.....	0	10	592	4
Fire clay.....	2	0	594	4
Sandstone, Upper Pocahontas.....	69	0	663	4
Slate.....	4	0	667	4
Coal No. 3 Pocahontas (771.8' L.)	0	3	667	7
Slate.....	3	1	670	8
Sandstone, Lower Pocahontas.....	32	2	702	10
Coal and bone, No. 2 "A" Pocahontas.....	1	2	704	0
Slate.....	2	6	706	6
Sandstone.....	2	10	709	4
Slate.....	4	0	713	4
Coal, No. 2 Pocahontas.....	0	4	713	8
Sandstone, Vivian, to bottom.....	20	8	734	4

363' 0"

61' 8'

75' 3"

36' 5"

9' 8"

The above boring starts 200 feet below the Sewell ("Davy") Coal as determined with aneroid by Gawthrop.

Coal Test Boring (No. 71 on Map II).

Big Creek District, on Clear Fork at mouth of Mudhole Branch,
 ½ mile northwest of Coalwood; well by Virginia Pocahontas Coal Co.;
 authority, H. N. Eavenson, elevation, 1459' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	26	6	26	6
Sandstone	29	6	56	0
Slate, black.....	0	6	56	6
Clay, soft.....	3	0	59	6
Shale, blue.....	14	0	73	6
Sandstone, Quinimont.....	47	0	120	6
Slate, black.....	0	6	121	0
Coal, Fire Creek.....	0	6	121	6
Shale and clay.....	3	0	124	6
Sandstone	30	0	154	6
Shale, gray.....	12	0	166	6
Shale, sandy.....	6	0	172	6
Sandstone .....38' }				
Sandstone, hard, } Pineville..	61	0	233	6
broken .....23 }				
Slate, gray.....	5	0	238	6
Sandstone, Pineville.....	52	0	290	6
Sandstone, conglomerate.....	12	0	302	6
Sandstone, white quartz.....	24	0	326	6
Slate, black.....	1	0	327	6
Fire clay, flinty.....	4	0	331	6
Sandstone, Flattop Mountain.....	65	0	396	6
Slate, black.....	25	0	421	6
Sandstone, gray.....	5	0	426	6
Sandstone .....52' }				
Sandstone, brown...37 }	89	0	515	6
Coal and slate, No. 6 Pocahontas..	3	8	519	2
Slate, gray.....	7	4	526	6
Bone and slate, mixed.....	2	0	528	6
Slate, gray.....	6	0	534	6
Sandstone, brown, Eckman.....	24	0	558	6
Coal, No. 5 Pocahontas, upper bench	1	0	559	6
Soapstone and shale, mixed.....	4	0	563	6
Shale	6	0	569	6
Sandstone	2	0	571	6
Shale, gray.....	13	0	584	6
Coal, No. 5 Pocahontas, lower				
bench	0	4	584	10
Sandstone	12	0	596	10
Shale, gray.....	17	8	614	6
Shale, variegated.....	6	0	620	6
Sandstone 22' }				
Sandstone, con- } Upper				
glomerate... 29 } Pocahontas.	71	0	691	6
Sandstone, gray .20 }				
Coal, shale and slate, No. 3 Po-				
cahontas, (764.5' L.).....	3	0	694	6
Shale, mixed with soapstone.....	7	0	701	6

121' 6"

397' 8"

40' 4"

109' 8"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, gray, sandy.....	10	0	711	6
Slate, black.....	6	0	717	6
Sandstone	5	0	722	6
Shale, gray.....	13	0	735	6
Sandstone, white quartz, Vivian...	59	0	794	6
Sandstone, hard, gray, Landgraff..	13	0	807	6
Slate, black.....	9	10	817	4
Coal, Landgraff.....	0	2	817	6
Shale, gray.....	4	0	821	6
Sandstone	23	0	844	6
Sandstone, soft.....	2	0	846	6
Sandstone	26	0	872	6
Shale, blue.....	20	0	892	6
Sandstone	46	0	938	6
Shale, dark.....	6	0	944	6
Sandstone	17	0	961	6
Limestone, top of Mauch Chunk Series	0	3	961	9
Sandstone, dark, and limestone to bottom	0	4	962	1

123' 0"

144' 0"

The above boring starts 200 feet below the Sewell ("Davy") Coal horizon, and penetrates the entire Pocahontas Group, the base of the latter coming 267 feet below the No. 3 Pocahontas Coal.

Coal Test Boring (No. 72 on Map II).

Big Creek District, $\frac{1}{4}$ mile up Mudhole Branch, 0.6 mile northwest of Coalwood; well by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1483.83' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	6	0	6	0
Shale	7	0	13	0
Sandstone, shaly..15' 0" } Upper	20	11	33	11
Sandstone				
Coal and slate, Little Raleigh....	2	5	36	4
Sandstone, dark.....	1	8	38	0
Sandstone, light.....	3	0	41	0
Sandstone, hard.....	12	0	53	0
Slate	3	0	56	0
Slate, light.....	2	0	58	0
Slate, black.....	1	0	59	0
Slate, light.....	2	0	61	0
Sandstone	1	0	62	0
Slate	12	0	74	0
Slate, light.....	1	0	75	0
Sandstone, hard, Lower Raleigh...	40	2	115	2
Slate	3	8	118	10
Coal, slate and bone, Beckley.....	3	4	122	2

36' 4"

85' 10"

	Thickness	Total	
	Ft. In.	Ft. In.	
Slate	4 10	127 0	
Sandstone 7' }			
Rock, very fine grained, hard 12 }	Quinnimont.. 19 0	146 0	
Slate, sandy, Quinnimont.....	16 10	162 10	
Coal, Fire Creek.....	3 1	165 11	43' 9"
Slate	2 8	168 7	
Sandstone	30 3	198 10	
Sandstone, gray.....	18 8	217 6	
Sandstone, light.....	5 0	222 6	
Sandstone, gray.....	6 10	229 4	
Fire clay and slate, Little Fire Creek Coal horizon.....	0 10	230 2	
Slate	2 10	233 0	
Sandstone, light.11' 6" }			
Sandstone, blue 4 9 }	Pineville.. 43 3	276 3	
Sandstone, gray.27 0 }			
Slate	6 8	282 11	
Sandstone	0 5	283 4	
Sandstone, light.....	0 6	283 10	
Slate	0 4	284 2	
Sandstone, light.....	14 5	298 7	
Slate	1 5	300 0	
Sandstone, light.....	4 2	304 2	
Slate	0 2	304 4	
Sandstone, light.....	20 2	324 6	
Sandstone, blue.....	1 0	325 6	
Slate	8 3	333 9	
Slate, blue.....	20 6	354 3	
Sandstone, gray.....	9 10	364 1	
Sandstone, blue.....	2 6	366 7	
Slate	3 7	370 2	
Sandstone, blue.. 4' 4" }			
Sandstone, gray.22 4 }	Flattop Mountain. 26 8	396 10	
Slate	19 4	416 2	
Coal, No. 7 Pocahontas.....	0 1	416 3	250' 4"
Fire clay and shale.....	0 6	416 9	
Sandstone ....28' 10" }			
Slate 0 6" }	Pierpont.. 109 3	526 0	
Sandstone, gray 79 11 }			
Sandstone	2 4	528 4	
Coal and slate, No. 6 Pocahontas..	2 6	530 10	114' 7"
Slate	5 8	536 6	
Sandstone, gray, Eckman.....	18 1	554 7	
Slate, blue.....	4 9	559 4	
Fire clay.....	1 3	560 7	
Slate	4 7½	565 2½	
Coal, No. 5 Pocahontas.....	7 1½	572 4	41' 6"
Slate	34 5	606 9	
Fire clay.....	1 0	607 9	
Coal, No. 4 Pocahontas.....	1 10	609 7	37' 3"
Slate	5 5	615 0	
Sandstone, light.....	9 9	624 9	
Sandstone, gray.....	15 10	640 7	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone	15	6	656	1
Slate	0	8	656	9
Sandstone, gray.....	7	11	664	8
Sandstone	9	7	674	3
Slate	2	6	676	9
Sandstone	11	5	688	2
Coal, slate and fire clay, No. 3 Pocahontas, (791' L.).....	4	0	692	2
Fire clay.....	1	0	693	2
Slate	1	9	694	11
Fire clay.....	1	0	695	11
Slate	1	0	696	11
Sandstone, to bottom.....	7	0	703	11
				11' 9"

The above boring starts 160 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 73 on Map II).

Big Creek District, at mouth of Snakeroot Branch, at Coalwood; well by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1455.65' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	19	6	19	6
Coal, Beckley.....	2	2	21	8
Shale, gray.....	10	6	32	2
Sandstone, Quinnimont	25	0	57	2
Shale, sandy...10' } Quinnimont	60	0	117	2
Shale, dark...29 { Shale				
Shale, sandy...10 {				
Shale, dark...11 }				
Coal, Fire Creek.....	1	0	118	2
Soapstone	3	0	121	2
Sandstone, Pineville	124	0	245	2
Shale, dark.....	11	0	256	2
Sandstone, conglomerate.....	34	0	290	2
Shale, sandy.....	10	0	300	2
Sandstone	61	0	361	2
Slate, black.....	20	0	381	2
Sandstone, Flatop Mountain	33	0	414	2
Coal, No. 7 Pocahontas.....	0	2	414	4
Sandstone, Pierpont	68	8	483	0
Slate, black.....	5	0	488	0
Coal, No. 6 Pocahontas.....	1	6	489	6
Sandstone, dark.....	9	6	499	0
Sandstone, Eckman	30	0	529	0
Slate, black.....	2	6	531	6
Coal, No. 5 Pocahontas.....	0	10	532	4
Soapstone	1	10	534	2
Shale, gray.....	14	0	548	2
Sandstone	27	0	575	2
				42' 10"



PLATE XV—Showing erect Calamite fossil tree in a sandstone ledge (Pierpont ?) along north bank of North Fork of Elkhorn Creek, $\frac{1}{4}$ mile east of mouth of Buzzard Branch.

Photo by A. T. Bragonier.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, dark.....	4	0	579	2
Sandstone, Upper Pocahontas	50	0	629	2
Slate, black.....	3	0	632	2
Sandstone, Upper Pocahontas	15	0	647	2
Slate, black.....	6	0	653	2
Coal, bone and slate, No. 3 Pocahontas, (798.4' L.)	4	0	657	2
Slate, dark.....	4	4	661	6
Sandstone	26	0	687	6
Slate, black.....	3	0	690	6
Coal, No. 2 Pocahontas	0	9	691	3
Slate, gray.....	12	3	703	6
Shale, sandy.....	4	0	707	6
Sandstone, Lower Pocahontas, to bottom	16	0	723	6

124' 10"

34' 1"

32' 3"

Coal Test Boring (No. 74 on Map II).

Big Creek District, on Clear Fork, $\frac{1}{2}$ mile southeast of Coalwood; well by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson, elevation, 1474.03' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	6	0	6	0
Sandstone	6	0	12	0
Slate	6	0	18	0
Coal	0	2	18	2
Slate	3	10	22	0
Sandstone, fine.....	3	6	25	6
Slate	9	0	34	6
Sandstone	2	6	37	0
Slate	0	3	37	3
Coal	0	2	37	5
Slate, soft.....	0	7	38	0
Slate, hard.....	6	0	44	0
Slate, sandy.....	5	0	49	0
Slate	0	5	49	5
Coal	0	11	50	4
Slate	4	8	55	0
Sandstone	40	0	95	0
Slate, soft, with coal	6	0	101	0
Sandstone	16	0	117	0
Slate, sandy.....	4	0	121	0
Slate	2	4	123	4
Coal, with slate, Fire Creek	0	8	124	0
Slate	16	0	140	0
Fire clay.....	2	7	142	7
Sandstone, hard.....	7	7	150	2
Slate	2	10	153	0
Slate, sandy.....	1	0	154	0
Sandstone, hard.....	47	3	201	3
Coal, Little Fire Creek	0	3	201	6
Slate	2	0	203	6

18' 2"

19' 3"

12' 11"

73' 8"

77' 6"

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sandstone	0	8	204	2	
Slate	0	10	205	0	
Slate, sandy.....	1	4	206	4	
Sandstone	15	11	222	3	
Slate	1	5	223	8	
Coal .....0' 6" }	1	4	225	0	23' 6"
Bone ....0 1 { No. 9 Pocahontas.					
Coal ....0 8 { (1249' L.)					
Bone ....0 1 }					
Slate	1	6	226	6	
Sandstone	13	6	240	0	
Sandstone, broken.....	14	0	254	0	
Slate	1	6	255	6	
Fire clay.....	3	4	258	10	
Stone, hard, blue.....	2	8	261	6	
Slate, sandy.....	8	6	270	0	
Sandstone, hard, fine grained.....	10	0	280	0	
Sandstone	7	0	287	0	
Slate, soft.....	9	2	296	2	
Slate	1	0	297	2	
Slate, sandy.....	2	0	299	2	
Sandstone, hard.....37' }	61	0	360	2	
Rock, very hard, blue 11 { Flattop					
Sandstone, hard..... 6 { Mountain.					
Rock, very hard, fine grained 7 }					
Sandstone, hard.....	5	0	365	2	
Slate, black.....	6	0	371	2	
Slate, sandy.....	3	0	374	2	
Slate, black.....	13	0	387	2	
Coal, No. 7 Pocahontas.....	0	3	387	5	162' 5"
Rock, fine, black.....	1	9	389	2	
Slate	1	0	390	2	
Sandstone, Pierpont.....	51	2	441	4	
Coal	0	0 $\frac{1}{2}$	441	4 $\frac{1}{2}$	
Sandstone	19	9 $\frac{1}{2}$	461	2	
Sandstone slate.....	17	0	478	2	
Coal .....0' 3" }	6	7	484	9	97' 4"
Bone .....0 4 }					
Slate .....0 9 }					
Coal .....0 4 }					
Slate .....0 6 }					
Coal .....0 2 }					
Slate .....0 3 }					
Coal .....0 3 }					
Bone .....0 3 }					
Slate .....0 5 }					
Coal .....0 10 }					
Slate .....0 3 }					
Coal .....0 5 }					
Slate .....0 5 }					
Coal .....0 4 }					
Slate .....0 8 }					
Bone .....0 2 }					

	Thickness		Total	
	Ft.	In.	Ft.	In.
Slate and bone.....	1	3	486	0
Slate	1	2	487	2
Sandstone	3	6	490	8
Shale, sandy.....	0	8	491	4
Sandstone	0	10	492	2
Slate	0	2	492	4
Sandstone	3	9	496	1
Slate, sandy.....	1	2	497	3
Sandstone	1	11	499	2
Sandstone, dark.....	2	6	501	8
Shale, sandy.....	3	0	504	8
Rock, fine, blue.....	1	0	505	8
Shale, sandy.....	8	6	514	2
Sandstone slate.....	6	7	520	9
Sandstone	17	3	538	0
Slate	1	0	539	0
Coal and bone, No. 5 Pocahontas..	0	3	539	3
Slate	19	6	558	9
Sandstone, fine.....	15	0	573	9
Sandstone	7	0	580	9
Slate	5	4	586	1
Coal .....0' 2" } No. 4 Pocahontas	6	1	592	2
Slate .....4 6 } (881.9' L.)				
Bone .....0 5 }				
Coal .....1 0 }				
Slate	1	7	593	9
Sandstone, Upper Pocahontas.....	59	0	652	9
Sandstone, hard.....	7	4	660	1
Slate	2	0	662	1
Coal .....0' 2" } No. 3	8	0	670	1
Slate, soft.....3 3 } Pocahontas..				
Coal and bone.0 3 } (803.9' L.)				
Slate .....3 0 }				
Shale .....1 0 }				
Coal .....0 4 }				
Sandstone	10	1	680	2
Sandstone, hard.....	11	0	691	2
Sandstone, to bottom.....	9	0	700	2

54' 6"

52' 11"

77' 11"

The above boring starts 265 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 76 on Map II).

Big Creek District, on Newsome Fork of Wolfpen Branch, 1.8 miles southeast of Coalwood; well No. 4 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson, elevation, 1608' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil and subsoil.....	17	0	17	0
Sandstone, broken.....	30	0	47	0
Sandstone, dark, hard.....	26	0	73	0

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, gray.....	24	0	97	0
Slate, black.....	4	0	101	0
Sandstone, Quinnimont	35	0	136	0
Coal, Fire Creek	1	4	137	4
Shale, gray.....	1	8	139	0
Sandstone, Pineville	77	0	216	0
Shale, gray.....	10	0	226	0
Coal, Little Fire Creek	2	2	228	2
Shale, gray.....	5	10	234	0
Sandstone, Pineville	47	0	281	0
Coal, No. 9 Pocahontas	0	4	281	4
Shale, gray.....	2	8	284	0
Sandstone.....	54	0	338	0
Sandstone, white, quartzy.....26'	} Flattop Mountain.	50	0	388
Sandstone, dark....24				
Fire clay, flinty.....	2	0	390	0
Sandstone, Pierpont	67	0	457	0
Slate, black.....	20	0	477	0
Shale, gray.....	4	0	481	0
Sandstone ..114' 0"	} Eckman	154	0	635
Shale, gray.. 0 4				
Sandstone, brown .. 39 8				
Coal .....0' 6"	} No. 4 Pocahontas ..	6	4	641
Parting .....0 1				
Coal .....5 9				
Fire clay and shale, mixed.....	2	8	644	0
Shale, gray.....	22	0	666	0
Shale, sandy.....	20	0	686	0
Shale, gray.....	8	0	694	0
Coal, No. 3 Pocahontas, (913.7' L.)	0	3	694	3
Shale, dark, mixed with soapstone.				

The above boring starts 265 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 77 on Map II).

Big Creek District, on Clear Fork, $\frac{1}{8}$ mile above Wolfpen Branch, 0.8 mile southeast of Coalwood; well No. 5 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1499.8' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil and subsoil.....	15	0	15	0
Shale, sandy.....	2	0	17	0
Shale, dark.....	25	0	42	0
Coal, Fire Creek, (1455' L.)	2	6	44	6
Fire clay.....	2	0	46	6
Shale, sandy.....	11	0	57	6
Slate, dark.....	36	6	94	0

	Thickness	Total	
	Ft. In.	Ft. In.	
Sandstone .....22' }			
Shale, dark.....12' }			
Sandstone .....24' }			
Slate, gray.....	16 0	168 0	
Coal, No. 9 Pocahontas.....	2 4	170 4	125' 10"
Fire clay.....	2 8	173 0	
Sandstone	71 0	244 0	
Shale, gray, sandy.....	10 0	254 0	
Sandstone	10 0	264 0	
Sandstone, hard, broken, Flattop			
Mountain	24 0	288 0	
Shale, gray.....	8 0	296 0	
Sandstone	17 0	313 0	
Shale, white.....	27 0	340 0	
Slate, dark.....	14 4	354 4	
Coal, No. 7 Pocahontas.....	0 8	355 0	184' 8"
Sandstone, Pierpont	50 0	405 0	
Slate, dark.....	34 0	439 0	
Sandstone, Pierpont	42 0	481 0	
Coal, No. 6 Pocahontas.....	0 6	481 6	126' 6"
Slate	1 6	483 0	
Sandstone, Eckman	20 0	503 0	
Slate, dark.....	31 0	534 0	
Sandstone, brown.....	8 0	542 0	
Slate, black.....	1 0	543 0	
Coal, No. 5 Pocahontas.....	0 4	543 4	61' 10"
Slate, black.....	5 8	549 0	
Sandstone, blue, broken.....	3 0	552 0	
Slate, black.....	11 6	563 6	
Sandstone	1 0	564 6	
Coal .....4' 4" }			
Bone .....0 4' }			
Coal .....0 4' }			
No. 4 Pocahontas 5 0		569 6	26' 2"
(930.3' L.)			
Slate, black.....	0 6	570 0	
Fire clay	4 0	574 0	
Shale, gray, sandy.....			

The above boring starts 260 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 78 on Map II).

Big Creek District, at mouth of Perrycamp Branch, $1\frac{1}{2}$ miles southeast of Coalwood; well No. 3 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson, elevation, 1537.83' L.

	Thickness	Total
	Ft. In.	Ft. In.
Soil and subsoil.....	30 0	30 0
Shale, dark.....	25 0	55 0
Slate, black.....	1 0	56 0
Fire clay.....	2 0	58 0
Shale, dark, sandy.....	12 0	70 0

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, gray.....	31	0	101	0
Sandstone, Quinnimont.....	44	0	145	0
Shale, sandy.....	7	0	152	0
Sandstone	26	0	178	0
Shale, gray.....	6	0	184	0
Coal, Little Fire Creek.....	1	6	185	6
Shale, gray.....	4	6	190	0
Sandstone, Pineville.....	113	0	303	0
Shale, sandy.....	12	0	315	0
Sandstone, white, broken.....	36	0	351	0
Shale, dark.....	3	0	354	0
Fire clay.....	4	0	358	0
Sandstone, Flattop Mountain.....	63	0	421	0
Shale, dark.....	17	0	438	0
Shale, gray.....	5	0	443	0
Sandstone, Pierpont.....	71	0	514	0
Shale, gray.....	2	0	516	0
Shale, sandy.....	2	0	518	0
Shale, gray.....	2	0	520	0
Sandstone	45	'	Eckman	81
Shale, gray.....	2			
Sandstone	5			
Sandstone, conglomerate	6			
Sandstone, broken....	23.5			
Slate, black.....	0	6	602	0
Coal	2'	0"	No. 4 Pocahontas	6
Slate	0	2		
Coal	4	2		
Shale, gray.....	11	8	620	0
Sandstone	11	0	631	0
Shale, gray.....	20	0	651	0
Sandstone, dark, broken.....	6	0	657	0
Slate, black.....	4	0	661	0
Bone	0'	2"	No. 3 Pocahontas	3
Slate	1	0		
Coal	1	10		
Shale, variegated.....			664	0

185' 6"

422' 10"

55' 8"

The above boring starts 265 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 79 on Map II).

Big Creek District, on Perrycamp Branch, 1.9 miles southeast of Coalwood; well No. 2 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson, elevation, 1662.37' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil and subsoil.....	35	0	35	0
Shale, gray.....	12	0	47	0

			Thickness Ft. In.	Total Ft. In.	
Sandstone, dark,					
broken	36'	0"			
Slate, dark.....	18	0			
Sandstone, conglomerate.....	36	0			
Sandstone, gray....	2	4			
Coal, Beckley.....			0	8	140' 0"
Shale, gray.....			2	0	142 0
Shale, sandy.....			18	0	160 0
Shale, gray.....			12	0	172 0
Fire clay, flinty.....			6	0	178 0
Sandstone			92	0	270 0
Shale, dark.....			2	6	272 6
Coal, Fire Creek.....			0	6	273 0
Shale, gray.....			2	0	275 0
Sandstone			29	0	304 0
Coal, Little Fire Creek.....			1	7	305 7
Shale, dark blue.....			3	5	309 0
Sandstone, Pineville.....			29	0	338 0
Coal			0	3	338 3
Shale, gray.....			1	9	340 0
Sandstone, conglomerate, Pineville.....			43	9	383 9
Coal, No. 9 Pocahontas.....			1	0	384 9
Shale, variegated.....			1	6	386 3
Sandstone, white.....			46	0	432 3
Shale, gray.....			6	9	439 0
Sandstone, Flattop Mountain.....			68	0	507 0
Shale, dark, Rift.....			19	0	526 0
Shale, gray.....			4	0	530 0
Sandstone, Pierpont.....			72	0	602 0
Coal	0'	8"			
Slate	1	8			
Coal	0	8			
Slate, dark.....			3	0	605 0
Sandstone, brown and blue.....	37'				
Slate, black.....	7				
Sandstone, brown and black.....	36				
Coal	0'	8"			
Bone	0	2			
Coal	5	8			
Shale, sandy.....			3	6	694 6
Sandstone, Upper Pocahontas.....			50	0	748 0
Shale, mixed with soapstone.....			6	0	754 0
Slate, black.....			3	0	757 0
Coal, No. 3 Pocahontas, (903' L.)...			2	4	759 4
Shale, dark.....					89' 6"
					64' 10"

The above boring starts about 160 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 80 on Map II).

Big Creek District, on head of Clear Fork, 1.8 miles southeast of Coalwood; well No. 1 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1654.65' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Soil and surface.....	12 0	12 0	
Sandstone, hard.....	36 0	48 0	
Shale, dark.....	5 0	53 0	
Sandstone	14 0	67 0	
Shale, gray, sandy.....	83 0	150 0	
Sandstone	12 0	162 0	
Shale, gray.....	3 0	165 0	
Slate, black.....	0 11	165 11	
Coal, Beckley, (1488.6' L.).....	0 2	166 1	166' 1"
Slate, black.....	0 11	167 0	
Sandstone, Quinnimont.....	104 0	271 0	
Shale, sandy.....	8 0	279 0	
Sandstone	19 0	298 0	
Shale, gray.....	8 0	306 0	
Sandstone, Pineville.....	68 0	374 0	
Coal, No. 9 Pocahontas.....	0 6	374 6	208' 5"
Shale, gray.....	2 4	376 10	
Sandstone	36 0	412 10	
Sandstone, conglomerate.....	4 0	416 10	
Coal	0 1	416 11	42' 5"
Sandstone, conglomerate.....	1 0	417 11	
Slate, gray.....	2 0	419 11	
Coal, No. 8 Pocahontas.....	1 0	420 11	4' 0"
Sandstone, gray.....	5 0	425 11	
Shale, sandy.....	18 0	443 11	
Sandstone, brown, white and blue, Flatop Mountain.....	10 6	454 5	
Slate, black.....	1 6	455 11	
Coal, No. 7 Pocahontas.....	0 2	456 1	35' 2"
Shale, dark.....	0 11	457 0	
Fire clay, flinty.....	8 0	465 0	
Shale, sandy.....	15 0	480 0	
Sandstone, gray, Pierpont.....	52 0	532 0	
Shale, gray.....	20 0	552 0	
Sandstone, Pierpont.....	46 11	598 11	
Coal, No. 6 Pocahontas.....	0 6	599 5	143' 4"
Sandstone	15 0	614 5	
Shale, gray.....	1 4	615 9	
Coal	0 2	615 11	16' 6"
Shale, sandy.....	20 1	636 0	
Sandstone .....36' }			
Shale, gray 6 { Eckman..	68 0	704 0	
Sandstone, brown {			
and blue .....26 }			
Slate, black.....	1 11	705 11	
Coal, No. 4 Pocahontas, (943.6' L.)..	5 3	711 2	95' 3"
Shale, gray.....	2 0	713 2	
Sandstone, Upper Pocahontas.....	52 0	765 2	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, gray.....	4	0	769	2
Bone	0	2	769	4
Shale, gray, mixed with soapstone.	4	0	773	4
Slate, black.....	0	2	773	6
Coal, No. 3 Pocahontas, (880.1' L.).	1	0	774	6
Shale, gray.....	5	0	779	6
Sandstone, at bottom.....				

63' 4"

The above boring starts 145 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 81 on Map II).

Big Creek District, near head of Clear Fork Branch, 1.3 miles N. 20° E. of Caretta; well No. 12 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1727.83' L.?

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil	30	0	30	0
Sandstone, Upper Raleigh	107	0	137	0
Coal, Little Raleigh	1	5	138	5
Shale, mixed with fire clay.....	4	7	143	0
Shale, gray, sandy.....	64	0	207	0
Sandstone, Lower Raleigh	16	0	223	0
Shale, hard, sandy.....	18	0	241	0
Coal 3' 4" } Beckley				
Slate, dark.....0 4 } ("War	3	10	244	10
Coal and bone ...0 2 } Creek")				
Shale, dark, sandy.....	10	2	255	0
Sandstone, Quinnimont	33	0	288	0
Coal	1	0	289	0
Shale, dark.....	6	0	295	0
Sandstone, hard.....	31	0	326	0
Shale, dark.....	10	0	336	0
Sandstone	34	0	370	0
Coal, Fire Creek	0	7	370	7
Shale, mixed with fire clay.....	5	5	376	0
Sandstone	39	0	415	0
Coal, Little Fire Creek	1	10	416	10
Shale, mixed with fire clay.....	1	8	418	6
Sandstone	17	6	436	0
Shale, dark.....	1	0	437	0
Coal	0	6	437	6
Shale, mixed with fire clay.....	3	0	440	6
Sandstone, hard, Pineville	44	6	485	0
Coal .....0' 4" }				
Sandstone ..1 6 } No. 9 Pocahontas	2	4	487	4
Coal .....0 6 }				
Shale, mixed with fire clay.....	3	8	491	0
Sandstone, hard, broken, Flattop				
Mountain	35	0	526	0
Shale, dark.....	2	0	528	0

138' 5"

106' 5"

44' 2"

81' 7"

46' 3"

20' 8"

49' 10"

	Thickness	Total	
	Ft. In.	Ft. In.	
Sandstone, Pierpont	87 0	615 0	
Shale, dark.....	57 0	672 0	
Coal, No. 6 Pocahontas	1 6	673 6	186' 2"
Shale, mixed with fire clay.....	5 6	679 0	
Sandstone, hard.....65' }			
Shale, dark.....18 }	Eckman 103 0	782 0	
Sandstone .....20 }			
Coal, No. 4 Pocahontas, (938.2' L. ?)	7 7	789 7	116' 1"
Shale, mixed with fire clay.....	3 5	793 0	
Shale, gray, sandy.....	9 0	802 0	
Sandstone			

The above boring starts about 40 feet below the Sewell ("Davy") Coal horizon.

Coal Test Boring (No. 82 on Map II).

Big Creek District, on head of Barrenshe Creek, 2.0 miles north-east of Caretta; well No. 11 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1773.95' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Soil	16 0	16 0	
Slate, sandy.....	4 0	20 0	
Sandstone	15 0	35 0	
Shale, mixed with fire clay.....	14 0	49 0	
Shale, gray, sandy.....	6 0	55 0	
Sandstone	7 0	62 0	
Shale, dark.....	0 6	62 6	
Coal, Little Raleigh	0 6	63 0	63' 0"
Shale, hard, sandy.....	6 0	69 0	
Sandstone, Lower Raleigh	117 0	186 0	
Shale, sandy.....	6 0	192 0	
Sandstone	26 0	218 0	
Coal .....0' 6" } Beckley			
Shale, dark....2 0 } ("War.....	3 4	221 4	158' 4"
Coal .....0 10 } Creek")			
Shale, gray, sandy.....	6 8	228 0	
Sandstone, hard, Quinnimont	88 0	316 0	
Shale, sandy.....	9 0	325 0	
Coal, Fire Creek	2 4	327 4	106' 0"
Sandstone, Pineville	111 2	438 6	
Coal, No. 9 Pocahontas	0 6	439 0	111' 8"
Shale, dark.....	2 0	441 0	
Sandstone, hard, broken.....	54 0	495 0	
Shale, gray, sandy.....	18 0	513 0	
Sandstone, Flattop Mountain	25 0	538 0	
Shale, dark, sandy.....	69 0	607 0	
Sandstone, Pierpont	64 0	671 0	
Slate, dark.....	9 0	680 0	
Coal, No. 6 Pocahontas	3 6	683 6	144' 6"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, dark.....	15	6	699	0
Shale, mixed with fire clay.....	14	0	713	0
Sandstone, Eckman	23	0	736	0
Shale, dark.....	2	0	738	0
Coal, No. 4 Pocahontas, (1029.2' L.)	6	9	744	9
Shale, mixed with fire clay.....				

61' 3"

The above boring starts about 80 feet below the horizon of the Sewell ("Davy") Coal.

Coal Test Boring (No. 83 on Map II).

Big Creek District, on Barrenshe Creek, 1½ miles northeast of Carretta; well No. 10 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1662.2' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil and subsoil.....	20	0	20	0
Shale, dark, sandy.....	14	0	34	0
Coal, Beckley	2	0	36	0
Sandstone.....	19	0	55	0
Shale, gray, sandy.....	8	0	63	0
Shale, mixed with fire clay.....	10	0	73	0
Sandstone.....	17	0	90	0
Sandstone, mixed with fire clay....	14	0	104	0
Sandstone.....	88	0	192	0
Shale, dark.....	1	0	193	0
Coal, Fire Creek	2	0	195	0
Shale, mixed with fire clay.....	1	0	196	0
Sandstone.....	42	0	238	0
Coal, Little Fire Creek	1	3	239	3
Shale, mixed with fire clay.....	1	0	240	3
Sandstone, Pineville	31	0	271	3
Coal, No. 9 Pocahontas	0	6	271	9
Shale, sandy.....	3	3	275	0
Sandstone.....	38	0	313	0
Shale, mixed with soapstone.....	2	0	315	0
Coal, No. 8 Pocahontas	1	0	316	0
Shale, mixed with fire clay.....	3	6	319	6
Sandstone, hard, Flattop Mountain .	54	0	373	6
Shale, mixed with fire clay.....	7	0	380	6
Shale, gray, sandy.....	31	0	411	6
Sandstone, Pierpont	30	0	441	6
Slate, dark, shaly.....	34	0	475	0
Coal, No. 6 Pocahontas	0	6	476	0
Slate, dark, shaly.....	24	6	500	6
Sandstone, hard, Eckman	21	0	521	6
Slate, dark, shaly.....	20	6	542	0
Coal, No. 5 Pocahontas, upper bench	1	6	543	6
Shale, sandy.....	5	0	548	6
Sandstone.....	5	0	553	6
Shale, dark.....	8	6	562	0

36' 0"

159' 0"

44' 3"

32' 6"

44' 3"

160' 0"

67' 6"

		Thickness		Total		
		Ft.	In.	Ft.	In.	
Coal, No. 5 Pocahontas, lower bench		1	2	563	2	19' 8"
Shale, dark.....		1	4	564	6	
Sandstone.....		7	0	571	6	
Shale, gray, sandy.....		12	0	583	6	
Shale, dark, mixed with soapstone..		8	0	591	6	
Sandstone, hard.....		29	6	621	0	
Coal.....1'	2½"	No. 4 Pocahontas (1033.7' L.).	7 6½	628	6½	65' 4½"
Bone.....0	1					
Coal.....2	6					
Sulphur.....0	0¼					
Coal.....2	0¾					
Sulphur						
binder.....0	1					
Coal.....1	4					
Bone.....0	3					
Shale, mixed with fire clay.....		2	0½	630	7	
Slate, shaly.....		24	0	654	7	
Shale, gray, sandy.....		22	0	676	7	
Shale, dark.....		2	0	678	7	
Coal, No. 3 Pocahontas, (982.4' L.).		1	3	679	10	51' 3½"
Shale, mixed with fire clay.....						

The above boring starts about 220 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 84 on Map II).

Big Creek District, on north side of Barrenshe Creek, 1.0 mile east of Caretta; well No. 9 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1584.04' L.

		Thickness		Total		
		Ft.	In.	Ft.	In.	
Soil and subsoil.....		19	6	19	6	
Shale, sandy.....		20	0	39	6	
Coal.....6'	0"	Beckley..... "War Creek"	11 6	51	0	51' 0"
Shale, dark...2	6					
Coal.....3	0					
Shale, dark.....		7	0	58	0	
Sandstone, hard, Quinnimont		92	0	150	0	
Shale, sandy.....		6	0	156	0	
Sandstone.....		13	0	169	0	
Shale, sandy.....		9	0	178	0	
Coal, Fire Creek		3	6	181	6	130' 6"
Shale, mixed with fire clay.....		0	6	182	0	
Sandstone.....		49	6	231	6	
Coal, Little Fire Creek		0	2	231	8	50' 2"
Fire clay.....		0	4	232	0	
Sandstone.....		13	0	245	0	
Shale, sandy.....		7	0	252	0	
Coal		0	2	252	2	20' 6"
Fire clay.....		1	10	254	0	
Shale, sandy.....		19	0	273	0	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone, hard, broken, Pineville	35	0	308	0
Shale, sandy.....	70	0	378	0
Sandstone	10	0	388	0
Shale, sandy.....	19	0	407	0
Slate, dark.....	14	0	421	0
Shale, mixed with fire clay.....	4	0	425	0
Shale, sandy.....	12	0	437	0
Bone and coal	0	10	437	10
Shale, sandy.....	7	2	445	0
Coal	0	6	445	6
Shale, dark.....	8	0	453	6
Coal .....3' 8" }				
Shale. ....1 10 } No. 6				
Shale, sandy.....6 0 } Pocahontas	16	1	469	7
Shale, sandy, hard 3 0 }				
Coal .....1 7 }				
Shale, sandy.....	14	0	483	7
Sandstone, hard, Eckman	6	8	490	3
Shale, hard, dark.....	29	0	519	3
Shale, dark, sandy.....	13	6	532	9
Sandstone	21	0	553	9
Coal .....0' 4 " }				
Bone .....0 2 }				
Coal .....1 8 }				
Bone .....0 1 }				
Coal .....2 2¾ } No. 4				
Bone binder.0 0¼ } Pocahontas ..	8	4	562	1
Coal .....0 0¾ } (1022' L.)				
Bone binder.0 0¼ }				
Coal .....3 4 }				
Bone .....0 5 }				
Soapstone	0	8	562	9
Shale, dark, sandy.....	3	7	566	4
Sandstone				

The above boring starts about 250 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 85 on Map II).

Big Creek District, on north side of Barrenshe Creek, at Caretta; well No. 8 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1490.85' L. ?

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil and subsoil.....	21	0	21	0
Coal , Beckley, "War Creek," (1466.3' L.).....	3	6	24	6
Shale and fire clay.....	4	0	28	6
Shale, sandy.....	6	0	34	6
Sandstone, Quinnimont	71	0	105	6
Shale, sandy, Quinnimont	19	0	124	6

	Thickness		Total				
	Ft.	In.	Ft.	In.			
Coal, Fire Creek.....	1	0	125	6	101' 0"		
Shale and fire clay, mixed.....	5	0	130	6			
Sandstone	20	0	150	6			
Shale, dark.....	16	0	166	6			
Coal .....1' 10"	}	Little Fire Creek	2	6	169	0	43' 6"
Bone .....0 1							
Coal .....0 7							
Shale, mixed with fire clay.....	2	6	171	6			
Shale, dark, sandy.....	8	0	179	6			
Sandstone, Pineville.....	33	0	212	6			
Shale, dark, mixed with fire clay...	3	0	215	6			
Coal .....0' 4½"	}	No. 9 Poca- hontas....	14	6	230	0	61' 0"
Slate .....0 0¼							
Coal .....0 4¼							
Slate .....0 0½							
Coal .....0 1½							
Slate .....0 2							
Coal .....0 5½							
Coal, cannel...0 0½	}						
Slate .....11 11							
Coal .....1 0							
Slate, sandy.....	7	6	237	6			
Sandstone	9	6	247	0			
Coal	1	0	248	0	18' 0"		
Slate, dark.....	1	6	249	6			
Shale, gray.....	22	6	272	0			
Coal, No. 8 Pocahontas.....	0	6	272	6	24' 6"		
Fire clay.....	2	0	274	6			
Shale, sandy.....	10	0	284	6			
Sandstone, Flattop Mountain.....	35	0	319	6			
Coal, No. 7 Pocahontas.....	0	6	320	0	47' 6"		
Shale, gray.....	13	0	333	0			
Sandstone	9	6	342	6			
Shale, dark.....	27	5	369	11			
Coal	0	1	370	0	50' 0"		
Fire clay.....	5	0	375	0			
Sandstone	18	0	393	0			
Shale, dark, sandy.....	21	0	414	0			
Coal	0	1	414	1	44' 1"		
Fire clay.....	2	0	416	1			
Sandstone, Pierpont.....	35	5	451	6			
Shale, dark.....	24	0	475	6			
Slate	6	0	481	6			
Coal .....0' 2 "	}	No. 6 Pocahontas	2	8	484	2	70' 1'
Slate ....0 1							
Coal .....0 2½							
Slate .....0 1½	}						
Coal .....2 1							
Shale, mixed with fire clay.....	2	4	486	6			
Shale, dark, sandy.....	22	0	508	6			
Sandstone, Eckman.....	8	0	516	6			
Slate, dark.....	16	0	532	6			
Fire clay and soapstone.....	10	0	542	6			

	Thickness	Total	
	Ft. In.	Ft. In.	
Sandstone	19 8	562 2	
Coal .....0' 6 " }			
Bone .....0 0 $\frac{1}{4}$ }			
Coal .....3 4 $\frac{1}{2}$ }	No. 4 Pocahontas 6 4	568 6	84' 4"
Bone .....0 0 $\frac{1}{4}$ }			
Coal .....2 5 }			
Slate, dark.....	2 0	570 6	
Sandstone, Upper Pocahontas.....	36 0	606 6	
Shale, sandy.....	9 8	616 2	
Coal .....0' 7" }			
Slate .....0 3 }			
Coal .....0 2 }	No. 3 Pocahontas 9 4	625 6	57' 0"
Shale, sandy 6 0 }	(865.3' L.)		
Soapstone ..0 4 }			
Coal .....2 0 }			
Sandstone, mixed with fire clay....			

The above boring starts about 260 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 86 on Map II).

Big Creek District, on Harmon Branch, 0.6 mile west of Caretta P. O.; well No. 7 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1490.62' L. ? (1445' B.)

	Thickness	Total	
	Ft. In.	Ft. In.	
Soil and subsoil.....	10 0	10 0	
Shale, sandy.....	3 0	13 0	
Subsoil, with boulders.....	21 0	34 0	
Shale, dark.....	19 0	53 0	
Shale, dark, sandy.....	19 0	72 0	
Coal, Beckley, "War Creek".....	3 0	75 0	75' 0"
Soapstone	1 0	76 0	
Shale, sandy.....	7 0	83 0	
Sandstone, Quinnimont.....	41 0	124 0	
Shale, dark..16' 0" }			
Shale, gray, sandy ...15 6 }	Quinnimont.. 43 0	167 0	
Shale, dark..11 6 }			
Coal, Fire Creek.....	0 6	167 6	92' 6"
Shale, gray, sandy.....	38 6	206 0	
Coal, Little Fire Creek.....	2 0	208 0	40' 6"
Shale, dark.....	8 0	216 0	
Sandstone	8 0	224 0	
Shale, sandy.....	4 0	228 0	
Sandstone	11 0	239 0	
Shale, dark.....	2 6	241 6	
Coal .....1' 0" }	No. 9 Pocahontas 8 8	250 2	42' 2"
Slate, dark..7 0 }	Upper Bench		
Coal .....0 8 }			
Slate, dark.....	4 10	255 0	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sandstone	19	0	274	0	
Slate, dark.....	0	2	274	2	
Coal, No. 9 Pocahontas, Lower					
Bench	1	4	275	6	25' 4"
Shale, dark, sandy.....	33	6	309	0	
Coal, No. 8 Pocahontas	0	10	309	10	34' 4"
Slate, dark.....	3	2	313	0	
Sandstone, mixed	35	0	348	0	
with iron ore.. 8' } Flattop					
Sandstone .....27 } Mountain.					
Shale, dark, sandy, Rift.....	17	6	365	6	
Coal, No. 7 Pocahontas	0	6	366	0	53' 0"
Shale	5	0	371	0	
Shale, dark.....	26	0	397	0	
Sandstone, Pierpont	40	0	437	0	
Slate, dark.....	40	0	477	0	
Shale	2	0	479	0	
Coal, No. 6 Pocahontas, upper bench	2	5	481	5	115' 5"
Shale	1	0	482	5	
Sandstone, hard.....	8	5	490	10	
Shale, dark.....	1	0	491	10	
Coal, No. 6 Pocahontas "Split,"					
lower bench	1	0	492	10	11' 5"
Shale, gray.....	4	6	497	4	
Sandstone	3	6	500	10	
Shale, dark.....	14	0	514	10	
Sandstone	20	0	534	10	
Sandstone, hard, broken.....	14	0	548	10	
Sandstone	2	0	550	10	
Slate, dark.....	4	6	555	4	
Shale, gray.....	21	6	576	10	
Sandstone	16	6	593	4	
Slate	0	0½	593	4½	
Coal .....0' 6½" } Bone ....0 0½" } Coal .....1 11½" } Bone ....0 1" } No. 4 Pocahontas 6 9 600 1½ 107' 3½" Coal .....3 11" } (890.5' L.) Bone ....0 0¾" } Sulphur .0 0¼" } Bone ....0 1½" } Shale, dark, sandy.....					

Coal Test Boring (No. 88 on Map II).

Big Creek District, near head of Harmon Branch, 1.2 miles southwest of Caretta; well No. 13 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson, elevation, 1653' L. (1590' B.)

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil	2	0	2	0
Sandstone, Upper Raleigh	50	0	52	0
Shale, mixed with fire clay.....	2	0	54	0

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, sandy.....	4	0	58	0
Sandstone	4	0	62	0
Shale, sandy.....	12	0	74	0
Sandstone	5	0	79	0
Shale, sandy.....	6	0	85	0
Sandstone	6	0	91	0
Slate, gray, sandy.....	19	0	110	0
Slate, gray, shelly, sandy.....	12	0	122	0
Slate, dark.....	47	0	169	0
Shale, variegated.....	26	0	195	0
Shale, dark, sandy.....	3	0	198	0
Shale, variegated.....	8	0	206	0
Slate, dark.....	13	0	219	0
Coal, Beckley, "War Creek".....	3	2	222	2
Shale, sandy.....	1	10	224	0
Sandstone, Quinnimont	51	0	275	0
Shale, gray.....	2	0	277	0
Coal	0	6	277	6
Shale, mixed with fire clay.....	3	6	281	0
Shale, gray.....	13	0	294	0
Coal	0	5	294	5
Shale, mixed with soapstone.....	2	7	297	0
Slate, dark.....	2	6	299	6
Coal and bone.....1' 9"	}	Fire Creek	4	3
Slate, dark.....2 0				
Coal .....0 6				
Shale, gray, sandy.....	7	3	311	0
Sandstone, gray.....	30	0	341	0
Shale, gray, sandy.....	9	0	350	0
Shale, mixed with fire clay.....	3	0	353	0
Sandstone, Pineville	41	0	394	0
Shale, dark.....	10	0	404	0
Coal .....0' 10"	}	No. 9 Pocahontas	4	1
Slate, dark 0 7				
Coal .....1 4				
Slate, dark 1 2				
Coal .....0 2	}		27	11
Slate, dark.....				
Shale, dark.....	19	0	436	0
Coal, No. 8 Pocahontas	0	6	455	6
Shale, mixed with fire clay.....	2	6	458	0
Shale, sandy.....	3	0	461	0
Sandstone, white quartz .....39'	}	Flattop Mountain	53	0
Sandstone .....14				
Shale, dark, sandy, Rift	15	0	529	0
Coal, No. 7 Pocahontas	1	0	530	0
Sandstone, hard, Pierpont	27	0	557	0
Slate, dark.....	32	0	589	0
Coal .....0' 6 "	}	No. 6 Pocahontas	1	10
Slate .....0 6				
Bone and coal...0 4½				
Slate .....0 3½				
Coal .....0 2	}		590	10

222' 2"

55' 4"

16' 11"

9' 4"

104' 4"

47' 5"

74' 6"

60' 10"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Shale, mixed with soapstone.....	3	2	594	0
Sandstone	3	0	597	0
Shale, sandy.....	6	0	603	0
Sandstone, Eckman	37	0	640	0
Shale, sandy.....	9	0	649	0
Sandstone, Eckman	44	0	693	0
Shale, dark, sandy.....	21	6	714	6
Sandstone	1	6	716	0
Coal .....2' 4" }	No. 4 Pocahontas		130' 8"	
Bone .....0 1 }				
Coal .....3 1 }				
	(931.5' L.)?			
Shale, mixed with fire clay.....	5	6	727	0
				5' 6"

The above boring starts 75 to 80 feet below the Sewe¹¹ ("Davy") Coal.

Coal Test Boring (No. 90 on Map II).

Big Creek District, on Threefork Branch, $\frac{1}{2}$ mile northeast of English; well No. 14 by Virginia Pocahontas Coal Co.; authority, H. N. Eavenson; elevation, 1441' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil	43	0	43	0
Shale, dark.....	1	0	44	0
Shale, sandy.....	72	0	116	0
Sandstone, hard.....	6	0	122	0
Shale, variegated.....	22	0	144	0
Sandstone, hard.....	8	6	152	6
Shale, dark.....	0	6	153	0
Coal, Beckley, "War Creek," (1286' L.).....	2	6	155	6
Shale, mixed with fire clay.....	1	6	157	0
Shale, dark.....	31	0	188	0
Sandstone	16	0	204	0
Shale, dark.....	3	0	207	0
Coal	1	0	208	0
Shale, mixed with fire clay.....	3	0	211	0
Shale, sandy.....	3	0	214	0
Shale, dark.....	7	0	221	0
Shale, sandy.....	7	0	228	0
Sandstone	42	0	270	0
Shale	40	0	310	0
Coal, Little Fire Creek	1	0	311	0
Shale, mixed with fire clay.....	3	0	314	0
Shale, dark.....	14	0	328	0
Coal .....1' 3" }	No. 9 Pocahontas		103' 0"	
Slate .....0 3 }				
Coal .....0 4 }				
Shale, mixed with fire clay.....	2	2	332	0
Shale, sandy.....	4	0	336	0
Sandstone	20	0	356	0

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Coal, No. 8 Pocahontas.....	0	3	356	3	45' 3"
Shale, mixed with fire clay.....	0	9	357	0	
Shale, sandy.....	26	0	383	0	
Coal, No. 7 Pocahontas.....	0	6	383	6	27' 3"
Shale, mixed with fire clay.....	1	6	385	0	
Sandstone, white, quartzzy, Pierpont	37	0	422	0	
Shale, dark.....	35	0	457	0	
Sandstone.....	18	0	475	0	
Shale, dark.....	28	0	503	0	
Fire clay.....	1	0	504	0	
Shale, mixed with fire clay.....	4	0	508	0	
Slate, dark.....	5	9	513	9	
Coal.....	0	3	514	0	130' 6"
Shale, mixed with fire clay.....	4	0	518	0	
Sandstone.....	5	0	523	0	
Shale, dark.....	2	8	525	8	12' 0"
Coal, No. 6 Pocahontas.....	0	4	526	0	
Shale, mixed with fire clay.....	2	0	528	0	
Sandstone.....	40	0	568	0	
Slate, dark, shaly.....	21	0	589	0	
Coal, No. 5 Pocahontas.....	0	6	589	6	
Shale, mixed with soapstone.....	1	6	591	0	63' 6"
Slate, dark, sandy.....	20	0	611	0	
Sandstone.....	36	6	647	6	
Slate, dark.....	0	2	647	8	64' 2"
Coal, No. 4 Pocahontas, (787.3' L.)	6	0	653	8	
Sandstone, mixed with fire clay...	7	4	661	0	
Shale, sandy.....					

The above boring starts 50 to 60 feet below the Sewell ("Davy") Coal.

Coal Test Boring (No. 91 on Map II).

Big Creek District, 250 feet up Bartlett Branch, and 1.2 miles north-west of English; well by Dry Fork Pocahontas Coal Co.; authority H. N. Eavenson; elevation, 1260' B.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sandstone and boulders.....	13	0	13	0	
Shale and sandstone partings.....	31	6	44	6	
Shale, dark.....	3	0	47	6	
Coal, Beckley, "War Creek," (1210' B.).....	2	4	49	10	49' 10"
Shale, sandy.....	2	0	51	10	138' 11"
Sandstone and shale.....	128	2	180	0	
Shale, blue.....	7	0	187	0	
Slate, b'ack.....	0	3	187	3	
Coal, Fire Creek.....	1	6	188	9	
Shale, dark.....	0	3	189	0	
Sandstone	81	0	270	0	
Coal, No. 9 Pocahontas.....	1	4	271	4	82' 7"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Fire clay.....	0	8	272	0
Sandstone	17	6	289	6
Shale, dark.....	0	3	289	9
Coal, No. 8 Pocahontas.....	0	9	290	6
Sandstone, hard, Flattop Mountain.	27	0	317	6
Coal	0	6	318	0
Fire clay.....	1	0	319	0
Shale, sandy.....	21	5	340	5
Coal .....0' 6"	} No. 7 Pocahontas (916' B.)	3 4	343	9
Slate .....0 2				
Shale, sandy.....2 0				
Coal .....0 8				
Sandstone, Pierpont, and shale.....	83	3	427	0
Shale, dark.....	0	3	427	3
Coal, No. 6 Pocahontas.....	0	3	427	6
Sandstone and shale.....	43	6	471	0
Coal, No. 5 Pocahontas.....	0	4	471	4
Sandstone, Eckman.....	77	9	549	1
Shale, dark.....	4	0	553	1
Coal .....2' 6"	} No. 4 Pocahontas (701' B.)	5 10	558	11
Bone coal.....0 1				
Coal .....3 3				
Fire clay	2	1	561	0
Shale and sandstone.....	19	0	580	0
Shale, dark.....	1	0	581	0
Coal .....0' 3"	} No. 3 Pocahontas (678' B.)	1 0	582	0
Slate .....0 4				
Coal .....0 5				
Fire clay to bottom.....	1	0	583	0

The above boring starts about 150 feet below the Sewell ("Davy") Coal at Mine No. 52 on Map II.

Coal Test Boring (No. 92 on Map II).

Big Creek District, on Atwell Branch, $\frac{1}{4}$ mile north of Atwell; well by McDowell Pocahontas Coal and Land Co.; authority, H. N. Eavenson; elevation, 1290' B.

"Hole drilled to depth of 625' 10"; found No. 3 Pocahontas (665' B.) with thickness of 31"; have no log of this hole. The interval between No. 3 and No. 4 Pocahontas in this hole was 82 feet. No. 6 showed a thickness of 0' 9".

The above boring starts 110 feet below the horizon of the Sewell ("Davy") Coal.

Coal Test Boring (No. 93 on Map II).

Big Creek District, on Little Slate Creek, 1.5 miles south of Atwell; well by Pocahontas Coal & Coke Co.; authority, Thomas H. Clagett; elevation, 1390' B.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface	12	0	12	0	
Sandstone, soft.....	4	0	16	0	
Sandstone	6	0	22	0	
Sandstone, with slaty streaks.....	12	3	34	3	
Coal, Sewell or "Davy," (1353' B.)	2	6	36	9	36' 9"
Sandstone	40	3	77	0	
Shale, dark, sandy.....	19	9	96	9	
Coal, Welch.....	0	9	97	6	60' 9"
Shale, dark, sandy.....	2	9	100	3	
Sandstone, with slaty streaks.....	22	6	122	9	
Shale, dark, sandy.....	14	11	137	8	
Coal, Little Raleigh.....	2	0	139	8	42' 2"
Shale, dark, sandy.....	29	4	169	0	
Sandstone, with slaty streaks.....	36	6	205	6	
Shale, dark, sandy.....	22	0	227	6	
Sandstone, with slaty streaks.....	9	6	237	0	
Sandstone	7	0	244	0	
Shale, dark, sandy.....	17	2	261	2	
Coal, Beckley, "War Creek".....	4	2	265	4	125' 8"
Sandstone	0	2	265	6	
Shale, sandy, to bottom.....	0	4	265	10	

Coal Test Boring (No. 96 on Map II).

Big Creek District, on north bank of Big Branch, 2.1 miles S. 70° W. of Berwind; well No. 21 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1629' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface soil.....	16	0	16	0	
Sandstone	8	0	24	0	
Slate and bone coal.....	3	6	27	6	27' 6"
Shale, mixed with fire clay.....	5	6	33	0	
Sandstone, Quinnimont	31	0	64	0	
Sandstone, with coal streaks.....	15	0	79	0	
Shale, mixed with soapstone.....	2	0	81	0	
Coal .....1' 0"	Fire Creek	3 4	84 4	56' 10"	
Shale, mixed with soapstone ...2 0					
Coal, bony.....0 4					
Shale, sandy.....	5	8	90	0	
Slate, dark, shaly.....	4	0	94	0	
Shale, gray, sandy.....	8	0	102	0	
Shale, dark.....	9	0	111	0	
Shale, sandy.....	7	0	118	0	
Sandstone	18	0	136	0	
Shale	1	0	137	0	

			Thickness Ft. In.	Total Ft. In.	
Coal	0' 9"	} Little Fire Creek	3 3	140 3	55' 11"
Shale	1 0				
Coal	1 6				
Shale and fire clay.....			2 9	143 0	
Shale, sandy.....			20 0	163 0	
Sandstone			7 0	170 0	
Shale, sandy.....			4 0	174 0	
Sandstone			1 0	175 0	
Coal	1' 0"	} No. 7 Poca- hontas....	13 0	188 0	47' 9"
Shale, mixed with fire clay.....	3 0				
Shale, dark.....	8 0				
Coal	1 0				
Shale, sandy.....			7 0	195 0	
Sandstone			5 0	200 0	
Coal			0 6	200 6	12' 6"
Shale, mixed with fire clay.....			2 6	203 0	
Shale, sandy.....			32 0	235 0	
Shale, dark.....			51 0	286 0	
Sandstone, hard, Flat top Mountain			33 0	319 0	
Shale, dark.....			2 0	321 0	
Sandstone			10 0	331 0	
Shale, sandy			12 0	343 0	
Quartz, white, Pierpont Sandstone			27 0	370 0	
Slate, dark, shaly.....			50 0	420 0	
Shale, mixed with soapstone.....			7 0	427 0	
Slate, mixed with coal.....			1 0	428 0	
Shale, sandy.....			12 0	440 0	
Sandstone, hard.....			15 0	455 0	
Coal, No. 6 Pocahontas.....			1 2	456 2	255' 8"
Shale, mixed with fire clay.....			3 10	460 0	
Sandstone			28 0	488 0	
Coal, No. 5 Pocahontas.....			1 0	489 0	32' 10"
Slate, mixed with fire clay.....			5 0	494 0	
Sandstone			20 0	514 0	
Coal, No. 4 Pocahontas.....			1 0	515 0	26' 0"
Sandstone			5 0	520 0	
Shale, sandy.....			15 0	535 0	
Shale, variegated.....			10 0	545 0	
Shale, dark, sandy.....			26 0	571 0	
Coal, No. 3 Pocahontas "Rider"...			0 6	571 6	56' 6"
Unrecorded			6 6	578 0	
Shale, impure fire clay.....			5 6	583 6	
Coal, No. 3 Pocahontas (1040' L.)			5 6	589 0	17' 6"
Shale, dark, mixed with fire clay..			3 0	592 0	
Sandstone, Lower Pocahontas, up- per division.....			25 0	617 0	
Coal, bony, No. 2 "A" Pocahontas..			1 0	618 0	29' 0"
Shale, dark.....			20 0	638 0	
Sandstone, Lower Pocahontas, low- er division			22 0	660 0	
Shale, sandy, to bottom.....			3 0	663 0	

The above boring starts 40 to 50 feet below the Beckiey ("War Creek") Coal.

Coal Test Boring (No. 98 on Map II).

Big Creek District, on Kewee Creek, 2.7 miles west of Canebrake; well No. 10 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1847.7' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface soil.....	5	0	5	0	
Sandstone, Quinnimont	57	0	62	0	
Coal	0	3	62	3	62' 3"
Fire clay.....	10	0	72	3	
Slate, black.....	5	0	77	3	
Coal	0	2	77	5	15' 2"
Fire clay.....	0	6	77	11	
Sandstone	40	1	118	0	
Shale, dark.....	2	0	120	0	
Slate, black.....	2	6	122	6	
Coal .....0' 7" } Fire clay.....1 0 } Coal .....0 9 } Fire Creek .. 2 11 Fire clay.....0 3 } Coal .....0 4 }			125	5	48' 0"
Fire clay.....	3	0	128	5	
Shale, dark.....	3	0	131	5	
Sandstone	27	0	158	5	
Shale, dark.....	22	0	180	5	
Coal, Little Fire Creek	1	6	181	11	56' 6"
Shale, dark, sandy.....	18	1	200	0	
Coal	0	3	200	3	18' 4"
Slate, black.....	1	0	201	3	
Sandstone	6	9	208	0	
Shale, dark.....	2	2	210	2	
Coal	0	5	210	7	10' 4"
Fire clay	2	0	212	7	
Shale, dark, sandy.....	13	5	226	0	
Slate, black.....	1	4	227	4	
Coal, No. 9 Pocahontas	0	3	227	7	17' 0"
Shale, dark, sandy.....	26	0	253	7	
Coal, No. 8 Pocahontas	0	2	253	9	26' 2"
Fire clay, sandy.....	1	6	255	3	
Sandstone, Flattop Mountain	36	6	291	9	
Shale, dark.....	8	6	300	3	
Coal	0	9	301	0	47' 3"
Fire clay, dark.....	2	0	303	0	
Shale, dark.....	3	6	306	6	
Coal	0	2	306	8	5' 8"
Fire clay, dark.....	2	0	308	8	
Shale, sandy.....	9	0	317	8	
Coal, No. 7 Pocahontas	0	3	317	11	11' 3"
Fire clay.....	1	6	319	5	
Sandstone	46	7	366	0	
Slate, black.....	6	0	372	0	
Fire clay.....	2	0	374	0	
Sandstone	4	9	378	9	
Shale, dark.....	27	3	406	0	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Slate, black.....	9	6	415	6	
Coal, No. 9 Pocahontas, upper bench	0	3	415	9	97' 10"
Fire clay.....	4	0	419	9	
Slate, black.....	3	9	423	6	
Coal .....0' 2" } No. 6 Pocahontas	1	0	424	6	8' 9"
Slate, black.0 6 } Lower Bench					
Coal .....0 4 }					
Shale	13	6	438	0	
Coal	0	6	438	6	14' 0"
Fire clay.....	9	0	447	6	
Sandstone	26	6	474	0	
Shale, dark.....	3	6	477	6	
Coal, No. 5 Pocahontas.....	1	1	478	7	40' 1"
Fire clay.....	5	0	483	7	
Shale, dark, sandy.....	10	0	493	7	
Slate, black.....	4	9	498	4	
Coal, No. 4 Pocahontas.....	1	0	499	4	20' 9"
Fire clay.....	1	0	500	4	
Shale, dark, sandy.....	6	6	506	10	
Slate, black.....	0	6	507	4	
Shale, dark, sandy.....	41	6	548	10	
Slate, black.....	11	0	559	10	
Shale, dark.....	15	0	574	10	
Coal, No. 3 Pocahontas, (1267.32' L.)	5	10½	580	8½	81' 4½"
Shale, dark, sandy, hard, to bottom	10	7½	591	4	

Coal Test Boring (No. 99 on Map II).

Big Creek District, on Kewee Creek, 1.8 miles west of Canebrake: well No. 9 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1747.6' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface soil.....	17	0	17	0
Sandstone	17	6	34	6
Shale, light, sandy.....	3	6	38	0
Sandstone, Flattop Mountain	45	0	83	0
Shale, dark.....8' } Rift	10	0	93	0
Slate, black.....2 }				
Coal, No. 7 Pocahontas	0	4	93	4
Shale, dark, sandy.....	4	0	97	4
Sandstone	7	4	104	8
Shale, dark, sandy.....	6	5	111	1
Sandstone, Pierpont	32	11	144	0
Shale, dark, sandy.....	11	6	155	6
Slate and shale.....	7	8	163	2
Coal	1	2	164	4
Fire clay.....	4	0	168	4
Shale, light, sandy.....	10	0	178	4
Sandstone	20	8	199	0
Coal	1	0	200	0
Fire clay, sandy.....	1	0	201	0
Sandstone	3	0	204	0

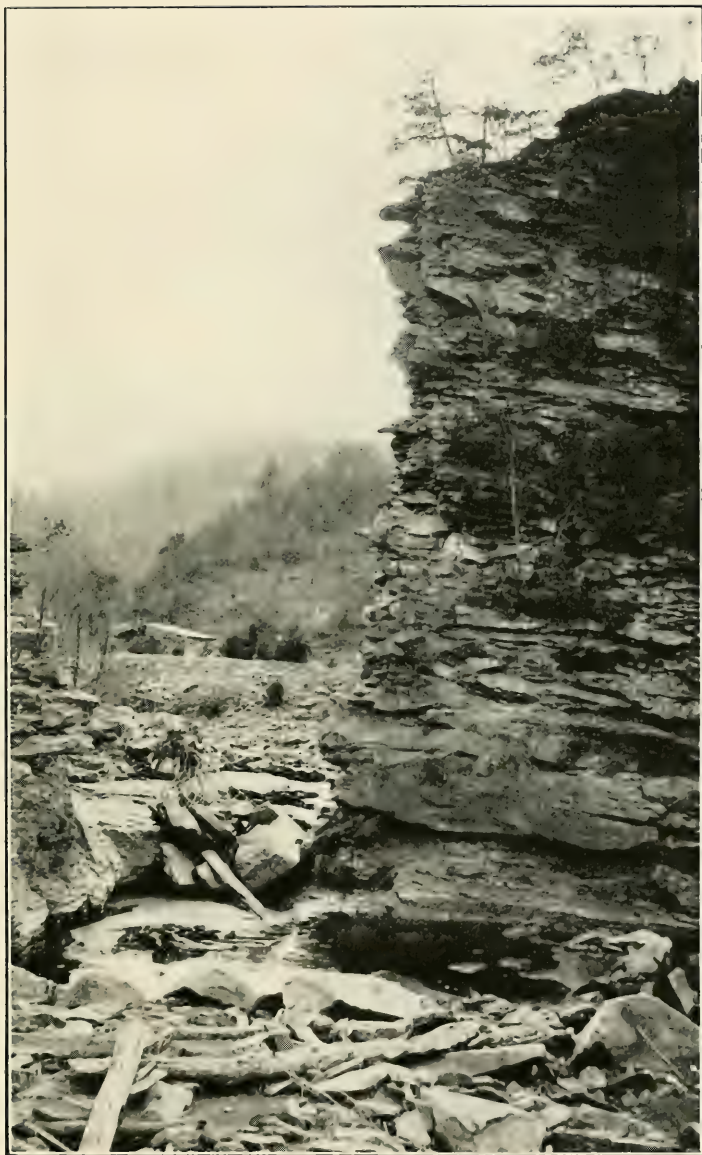


PLATE XVI—Showing example of stream piracy at Rift, McDowell County (see explanations under "Stream Piracy" in Chapter II, pages 31-32). Flattop Mountain Sandstone forms cliff, with Rift Shale at base.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Fire clay, shaly.....	11	0	215	0	
Shale, dark, sandy.....	8	8	223	8	
Coal, 2"					
bony....1' 3"					
Fire clay...1 0					
Sandstone...5 11					
Shale, dark...1 6					
Coal, bony...1 2					
} No. 6 Pocahontas					
	10	10	234	6	34' 6"
Fire clay, sandy.....	1	0	235	6	
Shale, dark, sandy.....	39	1	274	7	
Slate, black.....	9	0	283	7	
Coal	0	7	284	2	49' 8"
Fire clay, sandy.....	2	6	286	8	
Shale, dark, sandy.....	26	10	313	6	
Coal, No. 5 Pocahontas	0	5	313	11	29' 9"
Fire clay.....	4	0	317	11	
Shale, green.....	8	3	326	2	
Shale, dark, sandy.....	13	0	339	2	
Slate, black.....	0	2	339	4	
Coal and binder, No. 4 Pocahontas	0	6	339	10	25' 11"
Fire clay.....	4	0	343	10	
Sandstone, Upper Pocahontas	54	7	398	5	
Slate, black.....	0	1	398	6	
Coal, No. 3 Pocahontas, (1345.85' L.)	3	3	401	9	61' 11"
Fire clay to bottom.....	2	7	404	4	

Coal Test Boring (No. 100 on Map II).

Big Creek District, on Kewee Creek, 1.3 miles west of Canebrake; well No. 8 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1667.4' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface soil.....	30	0	30	0	
Sandstone	8	0	38	0	
Shale, light, sandy.....	21	0	59	0	
Shale, dark.....	7	0	66	0	
Slate	1	0	67	0	
Coal	0	8	67	8	67' 8"
Fire clay, slaty.....	8	0	75	8	
Shale, dark, sandy.....	10	0	85	8	
Sandstone	18	0	103	8	
Shale, dark.....	6	0	109	8	
Coal, No. 5 Pocahontas	0	4	110	0	42' 4"
Fire clay.....	6	0	116	0	
Shale, light, sandy.....	20	0	136	0	
Coal, No. 4 Pocahontas	0	6	136	6	26' 6"
Fire clay.....	5	0	141	6	
Sandstone, Upper Pocahontas	39	6	181	0	
Coal, No. 3 Pocahontas, (1483.90' L.)	2	6	183	6	47' 0"
Fire clay to bottom.....	3	6	187	0	

Coal Test Boring (No. 101 on Map II).

Big Creek District, 0.9 mile S. 70° W. of Canebrake; well No. 18 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 2273.89' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Surface soil.....	12 0	12 0	
Sandstone, Lower Raleigh	28 0	40 0	
Shale, dark, sandy.....	7 0	47 0	
Slate, black.....	2 10	49 10	
Coal, with 3" binder, Beckley	1 6	51 4	51' 4"
Fire clay.....	8 6	59 10	
Sandstone, Quinnimont	36 2	96 0	
Fire clay, shaly.....	10 0	106 0	
Sandstone	14 0	120 0	
Coal	0 2	120 2	68' 10"
Sandstone	40 4	160 6	
Coal, Fire Creek	0 6	161 0	40' 10"
Fire clay.....	5 0	166 0	
Sandstone	8 0	174 0	
Shale, light.....	20 0	194 0	
Sandstone	35 0	229 0	
Shale, dark.....	1 0	230 0	
Coal, Little Fire Creek	0 3	230 3	69' 3"
Fire clay.....	1 0	231 3	
Sandstone	17 0	248 3	
Fire clay.....	0 6	248 9	
Coal	0 3	249 0	18' 9"
Fire clay, shaly.....	4 0	253 0	
Sandstone, Pineville	81 9	334 9	
Shale, dark.....	26 6	361 3	
Fire clay.....	3 3	364 6	
Sandstone, Flatop Mountain	19 0	383 6	
Soapstone	0 6	384 0	
Coal	0 1	384 1	135' 1"
Fire clay.....	3 0	387 1	
Sandstone	13 0	400 1	
Shale, light.....	3 11	404 0	
Coal, No. 7 Pocahontas	1 6	405 6	21' 5"
Fire clay.....	2 0	407 6	
Sandstone	32 0	439 6	
Soapstone	0 6	440 0	
Coal	1 0	441 0	35' 6"
Fire clay, shaly.....	3 2	444 2	
Coal	0 2	444 4	3' 4"
Shale, dark.....	14 8	459 0	
Coal, No. 6 Pocahontas	0 9	459 9	15' 5"
Fire clay.....	1 0	460 9	
Sandstone	5 7	466 4	
Shale, dark.....	2 0	468 4	
Soapstone	6 0	474 4	
Shale, dark.....	39 2	513 6	
Slate, black.....	7 6	521 0	
Coal	0 3	521 3	61' 6"

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Shale, dark.....	14	0	535	3	40' 0"
Sandstone	25	9	561	0	
Coal, No. 5 Pocahontas.....	0	3	561	3	
Fire clay.....	11	4	572	7	
Sandstone	16	11	589	6	28' 9"
Coal, No. 4 Pocahontas.....	0	6	590	0	
Fire clay.....	5	0	595	0	
Sandstone, Upper Pocahontas.....	54	6	649	6	63' 2"
Coal, No. 3 Pocahontas, (1630.62' L.)	3	8	653	2	
Fire clay, shaly.....	4	6	657	8	
Shale, dark, sandy, to bottom.....	3	4	661	0	

Coal Test Boring (No. 104 on Map II).

Big Creek District, at head of south branch of Vall Creek, 3.0 miles southwest of Hartwell; well No. 13 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 2064.7' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface soil.....	28	0	28	0	
Shale, dark, sandy.....	22	0	50	0	
Sandstone, Pineville	57	0	107	0	
Shale, dark.....	16	0	123	0	
Slate, black.....	4	0	127	0	
Fire clay.....	1	6	128	6	
Sandstone	28	0	156	6	
Soapstone	2	6	159	0	
Sandstone, Flattop Mountain	38	0	197	0	
Shale, dark.....	53	0	250	0	
Coal, No. 7 Pocahontas	0	9	250	9	250' 9"
Fire clay.....	3	3	254	0	
Shale, dark.....	17	0	271	0	
Coal	0	8	271	8	20' 11"
Fire clay.....	1	0	272	8	
Sandstone, Pierpont	24	4	297	0	
Shale, dark, sandy.....	7	0	304	0	
Sandstone	10	0	314	0	
Shale	4	0	318	0	
Coal, No. 6 Pocahontas	0	8	318	8	47' 0"
Fire clay.....	2	4	321	0	
Shale, dark, sandy.....	48	0	369	0	
Sandstone	15	0	384	0	
Slate, black.....	6	0	390	0	
Shale, dark, sandy.....	24	0	414	0	
Coal	0	1	414	1	
Shale, dark.....	4	0	418	1	
Coal, 0' 7" bony, No. 4 Pocahontas	1	10	419	11	101' 3"
Fire clay.....	12	1	432	0	
Shale, dark, sandy.....	13	0	445	0	
Soapstone	7	0	452	0	
Sandstone, Upper Pocahontas	38	0	490	0	
Soapstone	1	0	491	0	
Sandstone	11	6	502	6	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soapstone	1	0	503	6
Sandstone	2	0	505	6
Shale, dark.....	2	6	508	0
Slate, black.....	0	6	508	6
Coal.....2' 0" }	3	1	511	7
Coal, bony.0 4½ }				
Coal .....0 8½ }				
No. 3 Pocahontas. (1553.14' L.)				
Shale, dark.....	1	0	512	7
Shale, hard, sandy, to bottom.....	4	5	517	0

91' 8"

Coal Test Boring (No. 105 on Map II).

Big Creek District, 1.0 mile northeast of Canebrake; well No. 2 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1974' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	20	0	20	0
Sandstone, Pineville.....	9	8	29	8
Coal, No. 9 Pocahontas.....	0	4	30	0
Fire clay.....	6	0	36	0
Sandstone	22	0	58	0
Slate, light, sandy.....	33	0	91	0
Sandstone, dark, Flattop Mountain.	18	0	109	0
Sandstone	1	0	110	0
Fire clay.....	9	0	119	0
Limestone, sandy.....	11	0	130	0
Soapstone	2	4	132	4
Coal	0	6	132	10
Fire clay.....	4	0	136	10
Shale, light.....	13	0	149	10
Sandstone	2	0	151	10
Shale, dark.....	10	2	162	0
Coal, No. 7 Pocahontas.....	0	8	162	8
Fire clay.....	2	0	164	8
Shale, dark.....	8	6	173	2
Soapstone	3	0	176	2
Slate, dark.....	8	0	184	2
Sandstone	7	0	191	2
Shale, light, sandy.....	28	0	219	2
Shale, dark.....	8	0	227	2
Slate, black.....	1	6	228	8
Fire clay.....	1	0	229	8
Slate, black.....	0	4	230	0
Coal, No. 6 Pocahontas.....	0	6	230	6
Fire clay.....	2	0	232	6
Sandstone	35	0	267	6
Slate, black.....	0	4	267	10
Coal, No. 5 Pocahontas.....	0	4	268	2
Fire clay.....	2	6	270	8
Slate, sandy, light.....	6	0	276	8
Slate, black.....	0	6	277	2
Fire clay.....	6	0	283	2

30' 0"

102' 10"

29' 10"

67' 10"

37' 8"

	Thickness		Total	
	Ft.	In.	Ft.	In.
Slate, light, sandy.....	13	0	296	2
Sandstone, Upper Pocahontas.....	73	10	370	0
Coal, trace, No. 3 Pocahontas, (1604' L.).....	0	0	370	0
Sandstone, Lower Pocahontas.....	57	0	427	0
Slate, black.....	3	0	430	0
Shale, dark.....	5	0	435	0
Sandstone, Vivian.....	2	6	437	6
Shale, dark, sandy.....	3	0	440	6
Fire clay.....	1	0	441	6
Shale, dark.....	1	6	443	0
Sandstone, Keystone.....	38	0	481	0
Shale, dark.....	12	0	493	0
Coal .....0' 5" } Keystone....	2	3	495	3
Sandstone .....0 6 } (1478.75' L.)				
Coal .....1 4 }				
Shale, dark, sandy, to bottom.....	6	0	501	3

Coal Test Boring (No. 106 on Map II).

Big Creek District, 1.1 miles northeast of Canebrake; well No. 1 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; well starts 120 feet under Beckley Coal; elevation, 2210.05' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Soil	3	0	3	0
Sandstone, Quinnimont.....	24	0	27	0
Shale, dark.....	4	0	31	0
Coal	1	0	32	0
Fire clay.....	9	0	41	0
Sandstone, Quinnimont.....	49	6	90	6
Shale, dark.....	6	0	96	6
Slate, black.....	0	6	97	0
Coal, cannel.....1' 0" }				
Slate, black.....4 0 }				
Coal, cannel.....0 10 } Fire Creek 12 3			109	3
Slate, black.....5 2 } (2100.8' L.)				
Coal, 3" bony.....1 3 }				
Fire clay.....	0	9	110	0
Sandstone	19	0	129	0
Shale, dark.....	4	6	133	6
Bone coal.....	0	2	133	8
Fire clay.....	2	0	135	8
Shale, dark, sandy.....	8	0	143	8
Sandstone	15	4	159	0
Shale, dark.....	5	0	164	0
Coal, Little Fire Creek.....	0	10	164	10
Fire clay.....	5	0	169	10
Sandstone, Pineville.....	28	2	198	0
Shale, dark.....	5	0	203	0
Sandstone	11	0	214	0
Shale, dark.....	6	0	220	0

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone, Pineville	52	0	272	0
Slate, black.....	5	0	277	0
Sandstone	19	0	296	0
Soapstone	3	0	299	0
Sandstone	5	0	304	0
Shale, dark, sandy.....	25	0	329	0
Sandstone, Pierpont	33	0	362	0
Shale, dark.....	8	0	370	0
Slate, black.....	2	6	372	6
Coal	0	4	372	10
Fire clay.....	2	2	375	0
Shale, dark.....	15	0	390	0
Coal	1	0	391	0
Fire clay.....	6	0	397	0
Shale, light, sandy.....	2	0	399	0
Shale, dark.....	2	6	401	6
Sandstone	7	6	409	0
Shale, dark.....	23	0	432	0
Coal, No. 6 Pocahontas	0	2	432	2
Shale, dark.....	41	10	474	0
Slate, black.....	7	0	481	0
Coal, No. 5 Pocahontas	0	8	481	8
Fire clay.....	2	4	484	0
Sandstone	37	0	521	0
Coal, No. 4 Pocahontas	0	6	521	6
Fire clay.....	10	0	531	6
Shale, light, sandy.....	10	6	542	0
Sandstone, Upper Pocahontas	61	0	603	0
Coal, No. 3 Pocahontas, (1605' L.)	2	0	605	0
Shale and fire clay.....	4	8	609	8
Shale, dark.....	3	9	613	5
Sandstone to bottom.....	6	1	619	6

208' 0"

59' 4"

49' 6"

39' 10"

83' 6"

Coal Test Boring (No. 107 on Map II).

Big Creek District, 1.8 miles east of Berwind; well No. 3 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 2346.42' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface soil.....	20	0	20	0
Sandstone, Upper Raleigh	77	0	97	0
Shale, sandy.....	3	6	100	6
Sandstone, with coal streaks.....	63	6	164	0
Shale, gray, sandy.....	7	6	171	6
Coal, Beckley, "War Creek"	2	6	174	0
Shale and fire clay.....	6	0	180	0
Sandstone, Quinnimont	51	0	231	0
Shale, gray.....	16	0	247	0
Coal, Fire Creek	1	0	248	0
Shale and fire clay.....	1	0	249	0
Sandstone	25	0	274	0
Shale, dark.....	0	6	274	6

174' 0"

74' 0"

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Coal, Little Fire Creek.....	0	6	275	0	27' 0"
Shale, gray.....	10	0	285	0	
Sandstone	20	0	305	0	
Shale, gray.....	6	0	311	0	
Coal	1	0	312	0	37' 0"
Shale and fire clay.....	4	0	316	0	
Coal	0	6	316	6	4' 6"
Shale and fire clay.....	4	0	320	6	
Sandstone	16	6	337	0	
Coal	0	6	337	6	21' 0"
Shale and fire clay.....	3	6	341	0	
Sandstone, Pineville.....	24	0	365	0	
Shale, dark.....	3	0	368	0	
Coal, No. 9 Pocahontas.....	0	6	368	6	31' 0"
Sandstone, Flattop Mountain.....	131	6	500	0	
Shale, gray.....	10	0	510	0	
Coal, No. 7 Pocahontas.....	1	0	511	0	142' 6"
Shale and fire clay, mixed.....	3	0	514	0	
Shale, gray.....	20	0	534	0	
Coal .....1' 0" }					
Soapstone..7 0 } No. 6 Pocahontas.	8	1	542	1	31' 1"
Coal .....0 1 }					
Shale, dark, sandy.....	84	11	627	0	
Slate, black.....	10	0	637	0	
Coal, No. 5 Pocahontas.....	0	8	637	8	95' 7"
Fire clay, slaty.....	4	4	642	0	
Sandstone	25	6	667	6	
Shale, dark, sandy.....	7	6	675	0	
Coal, No. 4 Pocahontas.....	0	7	675	7	37' 11"
Fire clay.....	6	0	681	7	
Shale, light.....	4	0	685	7	
Slate, black.....	3	5	689	0	
Shale, light, sandy.....	17	0	706	0	
Soapstone	4	0	710	0	
Sandstone, Upper Pocahontas.....	27	2	737	2	
Coal .....2' 0" } No. 3 Pocahontas.	2	4	739	6	63' 11"
Bone coal...0 4 } (1607.23' L.)					
Fire clay, shaly.....	5	6	745	0	
Shale, dark.....	8	0	753	0	
Sandstone to bottom.....	27	0	780	0	

Coal Test Boring (No. 108 on Map II).

Big Creek District, 1.0 mile east of Berwind; well No. 4 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1836.65' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface soil.....	10	0	10	0
Sandstone, Pierpont.....	28	0	38	0
Shale, dark, sandy.....	49	0	87	0
Sandstone.....	9	0	96	0
Shale, dark.....	3	6	99	6

	Thickness Ft. In.	Total Ft. In.	
Coal .....0' 6" }			
Shale .....0 6 }			
Coal .....0 4 }	No. 7 Pocahontas.	3 6	103 0
Soapstone...2 0 }			
Coal .....0 2 }			
Soapstone	3 0	106 0	
Shale, sandy.....	17 0	123 0	
Shale, dark.....	4 0	127 0	
Coal	0 10	127 10	24' 10"
Soapstone	4 0	131 10	
Sandstone	13 0	144 10	
Shale, dark.....	5 0	149 10	
Sandstone	6 0	155 10	
Shale, dark.....	1 2	157 0	
Coal .....0' 8" }			
Shale, dark 1 6 }	No. 6 Pocahontas	2 5	159 5
Coal .....0 3 }			31' 7"
Fire clay.....	2 0	161 5	
Shale, light, sandy.....	6 0	167 5	
Shale, dark, sandy.....	28 0	195 5	
Sandstone	5 7	201 0	
Shale, dark.....	15 0	216 0	
Slate	4 0	220 0	
Fire clay.....	1 0	221 0	
Coal, No. 5 Pocahontas.....	0 6	221 6	63' 10"
Fire clay, shaly.....	2 0	223 6	
Shale, sandy.....	6 0	229 6	
Sandstone	8 2	237 8	
Shale, light, sandy.....	17 0	254 8	
Coal, No. 4 Pocahontas.....	0 5	255 1	33' 7"
Fire clay.....	5 0	260 1	
Shale, light, sandy.....	4 1	264 2	
Slate	1 0	265 2	
Fire clay.....	6 0	271 2	
Slate, light.....	9 0	280 2	
Sandstone, Upper Pocahontas.....	20 0	300 2	
Sandstone and coal spars, No. 3 Pocahontas, (1533.0' L.).....	3 6	303 8	48' 5"
Sandstone, Lower Pocahontas.....	56 10	360 6	
Coal	0 4	360 10	57' 2"
Sandstone	2 0	362 10	
Shale, sandy.....	1 0	363 10	
Sandstone, Vivian.....	47 0	410 10	
Fire clay.....	2 2	413 0	
Coal, No. 1 Pocahontas.....	0 2	413 2	52' 4"
Fire clay.....	1 6	414 8	
Shale, dark, to bottom.....	5 6	420 2	

Coal Test Boring (No. 109 on Map II).

Big Creek District, 0.7 mile south of Berwind; well No. 7 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1770.80' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface soil.....	18	0	18	0
Sandstone	42	0	60	0
Slate, dark, sandy.....	23	0	83	0
Fire clay.....	3	6	86	6
Sandstone	16	0	102	6
Shale, dark.....	23	0	125	6
Coal, No. 7 Pocahontas.....	1	6	127	0
Fire clay.....	4	6	131	6
Shale, light, sandy.....	10	0	141	6
Sandstone	15	0	156	6
Coal	0	8	157	2
Fire clay.....	1	6	158	8
Shale, dark.....	29	0	187	8
Coal, No. 6 Pocahontas.....	0	6	188	2
Fire clay.....	1	0	189	2
Shale, sandy, light.....	9	0	198	2
Shale, sandy.....	3	0	201	2
Fire clay, slaty.....	47	0	248	2
Coal, No. 5 Pocahontas.....	0	6	248	8
Fire clay.....	3	4	252	0
Sandstone	22	0	274	0
Fire clay, shaly.....	11	0	285	0
Shale, dark.....	9	0	294	0
Coal, No. 4 Pocahontas.....	0	2	294	2
Fire clay.....	8	6	302	8
Sandstone, Upper Pocahontas.....	53	0	355	8
Coal, No. 3 Pocahontas, (1412.05' L.)	3	1	358	9
Fire clay to bottom.....	4	3	363	0

127' 0"

30' 2"

31' 0"

60' 6"

45' 6"

64' 7"

Coal Test Boring (No. 110 on Map II).

Big Creek District, ½ mile southwest of Berwind; well No. 5 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1690.56' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface soil.....	40	0	40	0
Shale, light.....	12	0	52	0
Sandstone	37	0	89	0
Slate	2	0	91	0
Fire clay.....	2	0	93	0
Slate, light, sandy.....	4	0	97	0
Sandstone	10	6	107	6
Shale, dark.....	2	6	110	0
Coal, No. 8 Pocahontas.....	0	6	110	6
Fire clay.....	2	0	112	6
Shale, dark, sandy.....	15	0	127	6
Sandstone, Flattop Mountain.....	21	0	148	6

110' 6"

	Thickness	Total	
	Ft. In.	Ft. In.	
Fire clay.....	6 0	154 6	
Shale, dark.....	5 0	159 6	
Sandstone	17 6	177 0	
Shale, dark.....	34 0	211 0	
Coal .....0' 6" }			
Fire clay...4 0 }	No. 7 Pocahontas 4 8	215 8	105' 2"
Coal .....0 2 }			
Fire clay.....	1 0	216 8	
Shale, light.....	29 0	245 8	
Coal .....0 10		246 6	30' 10"
Fire clay.....	1 6	248 0	
Shale	17 0	265 0	
Coal .....1 0		266 0	19' 6"
Soapstone	3 0	269 0	
Shale, light.....	11 6	280 6	
Coal .....0 2		280 8	14' 8"
Fire clay.....	0 6	281 2	
Shale, light, sandy.....	4 0	285 2	
Sandstone	5 6	290 8	
Shale, dark.....	5 0	295 8	
Coal .....1' 2" }			
Binder .....0 2 }	No. 6 Pocahontas 1 6	297 2	16' 6"
Coal .....0 2 }			
Fire clay.....	3 6	300 8	
Shale, dark.....	51 0	351 8	
Slate	1 4	353 0	
Soapstone	0 8	353 8	
Coal .....0 10		354 6	57' 4"
Fire clay, shaly.....	3 0	357 6	
Sandstone	22 2	379 8	
Slate	0 4	380 0	
Coal, No. 5 Pocahontas.....	0 6	380 6	26' 0"
Fire clay, shaly.....	4 6	385 0	
Shale, dark.....	18 0	403 0	
Coal .....0' 2" }			
Shale, dark.0 7 }	No. 4 Pocahontas 1 0	404 0	23' 6"
Coal .....0 3 }			
Shale, dark.....	1 6	405 6	
Fire clay.....	6 0	411 6	
Sandstone, Upper Pocahontas.....	43 10	455 4	
Coal .....2' 5" }			
Bone .....0 1 }	No. 3 Pocahontas 3 3	458 7	55' 6"
Coal .....0 9 }	(1232' L.)		
Fire clay to bottom.....	3 5	462 0	

Coal Test Boring (No. 111 on Map II).

Big Creek District, 0.4 mile S. 85° W. of Berwind; well No. 23 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation 1627.41' L.

	Thickness	Total
	Ft. In.	Ft. In.
Surface soil.....	15 0	15 0

	Thickness		Total	
	Ft.	In.	Ft. In.	
Shale, light.....	4	0	19 0	
Unrecorded	10	0	29 0	
Shale, dark.....	5	0	34 0	
Shale, sandy.....	8	0	42 0	
Sandstone	35	0	77 0	
Shale, dark.....	2	0	79 0	
Coal, No. 8 Pocahontas.....	0	4	79 4	79' 4"
Unrecorded	37	8	117 0	
Shale, dark.....	3	0	120 0	
Sand rock.....	4	0	124 0	
Shale, dark.....	25	0	149 0	
Coal .....0' 2" } No. 7 Pocahontas	7	4	156 4	77' 0"
Fire clay...3 10 }				
Shale, dark.3 0 }				
Coal .....0 4 }				
Fire clay.....	1	8	158 0	
Shale, dark.....	5	0	163 0	
Sandstone	7	0	170 0	
Shale, dark.....	6	0	176 0	
Coal .....1 0	1	0	177 0	20' 8"
Shale, dark.....	2	0	179 0	
Sandstone	27	0	206 0	
Coal .....0 10	0	10	206 10	29' 10"
Fire clay.....	1	2	208 0	
Shale, dark.....	3	0	211 0	
Sandstone	6	0	217 0	
Slate, dark.....	1	0	218 0	
Coal .....0 2	0	2	218 2	11' 4"
Shale, dark.....	17	10	236 0	
Coal, No. 6 Pocahontas.....	0	9	236 9	18' 7"
Shale, dark.....	11	3	248 0	
Sandstone	3	0	251 0	
Shale, dark.....	44	0	295 0	
Fire clay.....	2	0	297 0	
Coal, No. 5 Pocahontas.....	1	0	298 0	61' 3"
Shale, dark.....	7	0	305 0	
Sandstone	20	0	325 0	
Coal, No. 4 Pocahontas.....	0	8	325 8	27' 8"
Fire clay.....	5	4	331 0	
Shale, dark.....	25	0	356 0	
Sandstone, Upper Pocahontas.....	42	0	398 0	
Coal .....2' 1" } No. 3 Pocahontas	3	7	401 7	75' 11"
Bone .....0 9 }				
Coal .....0 9 }				(1225.8' L.)
Fire clay to bottom.....	3	8	405 3	

Coal Test Boring (No. 112 on Map II).

Big Creek District, 0.2 mile west of Berwind; well No. 22 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1478.4' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface soil.....	18	0	18	0
Shale, sandy.....	10	0	28	0
Fire clay.....	2	0	30	0
Shale, dark.....	4	0	34	0
Coal, smut.....	0	10	34	10
Fire clay.....	2	2	37	0
Sandstone, Pierpont	31	0	68	0
Shale, sandy.....	17	0	85	0
Shale, dark.....	12	0	97	0
Coal, No. 6 Pocahontas.....	0	6	97	6
Fire clay.....	0	6	98	0
Shale, sandy.....	8	0	106	0
Shale, dark, sandy.....	44	0	150	0
Slate, blue.....	2	6	152	6
Fire clay.....	1	6	154	0
Shale, sandy.....	4	0	158	0
Sandstone, Eckman	21	0	179	0
Slate, black.....	1	6	180	6
Fire clay.....	4	0	184	6
Shale, dark.....	11	0	195	6
Coal, bony, No. 4 Pocahontas.....	0	6	196	0
Shale, dark.....	12	0	208	0
Sandstone, Upper Pocahontas	42	6	250	6
Shale, dark.....	1	0	251	6
Coal .....2' 3" } No. 3 Pocahontas	3	7	255	1
Bone .....0 2 }				
Coal .....1 2 }				
Fire clay to bottom.....	4	0	259	1

34' 10"

62' 8"

98' 6"

59' 1"

Coal Test Boring (No. 113 on Map II).

Big Creek District, on branch 0.7 mile N. 60° W. of Berwind; well No. 24 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1609.78' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface	15	0	15	0
Slate, dark.....	10	0	25	0
Coal, Little Fire Creek	0	8	25	8
Fire clay.....	4	4	30	0
Sandstone	6	0	36	0
Shale, light.....	6	0	42	0
Unrecorded (print faded).....	225	9	267	9
Shale, dark.....	8	0	275	9
Coal, No. 7 Pocahontas.....	1	0	276	9
Fire clay.....	3	0	279	9
Sandstone	10	0	289	9

25' 8"

	Thickness	Total	
	Ft. In.	Ft. In.	
Shale	17 0	306 9	
Sandstone	10 0	316 9	
Shale, dark	4 0	320 9	
Coal, No. 6 Pocahontas	0 10	321 7	44' 10"
Fire clay	2 2	323 9	
Shale, dark	44 0	367 9	
Slate	2 0	369 9	
Fire clay	4 3	374 0	
Shale, dark	2 0	376 0	
Sandstone, Eckman	26 0	402 0	
Shale, dark	1 0	403 0	
Fire clay	6 0	409 0	
Shale, dark	18 0	427 0	
Shale, light	2 0	429 0	
Shale, dark	1 9	430 9	
Coal, No. 4 Pocahontas	0 4	431 1	109' 6"
Fire clay	2 8	433 9	
Sandstone, Upper Pocahontas	36 0	469 9	
Shale, dark	1 0	470 9	
Sandstone	4 0	474 9	
Slate, soft	0 4	475 1	
Shale, dark	0 6	475 7	
Coal, No. 3 Pocahontas, (1131.2' L.)	3 0	478 7	47' 6"
Fire clay to bottom	3 0	481 7	

Coal Test Boring (No. 115 on Map II).

Big Creek District, on north side of Jacob Fork, 1.8 miles north-east of Berwind; well No. 57 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1455' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Sand	11 0	11 0	
Sandstone	2 0	13 0	
Slate	4 0	17 0	
Sandstone	5 0	22 0	
Slate	6 11	28 11	
Coal, No. 5 Pocahontas	2 4	31 3	31' 3"
Slate	6 9	38 0	
Sandstone	36 0	74 0	
Slate	7 11	81 11	
Coal, No. 4 Pocahontas	1 5	83 4	52' 1"
Sandstone, slaty	35 4	118 8	
Coal, No. 3 Pocahontas "Rider"	0 6	119 2	35' 10"
Slate, sandy	44 10	164 0	
Coal, No. 3 Pocahontas (1286.2' L.)	4 10	168 10	49' 8"
Slate	8 2	177 0	
Slate, sandy	7 0	184 0	
Sandstone	6 0	190 0	

Coal Test Boring (No. 121 on Map II).

Big Creek District, on north side of Big Creek, 1.9 miles N. 30° E. of Rift; well No. 22 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; elevation, 1482.83' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface soil.....	5	0	5	0	
Sandstone	12	0	17	0	
Slate, sandy.....	4	0	21	0	
Shale, dark, and fire clay.....	2	5	23	5	
Shale, gray.....	12	0	35	5	
Fire clay, bastard.....	1	7	37	0	
Shale, light.....	15	0	52	0	
Sandstone, Flatop Mountain	44	0	96	0	
Shale, dark.....	48	0	144	0	
Coal, clean. 1' 8" }					
Coal, bony. 0 7 } No. 7 Pocahontas	2	5	146	5	146' 5"
Coal 0 2 }					
Shale, and fire clay.....	0	7	147	0	
Shale, sandy.....	17	0	164	0	
Sandstone	21	0	185	0	
Coal, No. 6 Pocahontas	1	8	186	8	40' 3"
Soapstone, shaly.....	0	4	187	0	
Shale, sandy.....	26	6	213	6	
Coal, No. 5 Pocahontas	1	8	215	2	28' 6"
Shale and soapstone.....	2	0	217	2	
Shale, sandy.....	8	0	225	2	
Sandstone	5	4	230	6	
Shale, sandy.....	24	6	255	0	
Shale and soapstone.....	6	0	261	0	
Shale, sandy, hard.....	1	0	262	0	
Shale and soapstone.....	1	6	263	6	
Coal, No. 4 Pocahontas	1	2	264	8	49' 6"
Shale, gray, sandy.....	7	4	272	0	
Sandstone, hard.....	16	0	288	0	
Sandstone	4	6	292	6	
Coal, No. 3 Pocahontas "Rider"	0	6	293	0	28' 4"
Shale and fire clay.....	5	0	298	0	
Shale, sandy.....	17	0	315	0	
Soapstone	8	0	323	0	
Shale, sandy.....	19	4	342	4	
Coal	0	3	342	7	49' 7"
Shale and soapstone.....	4	7	347	2	
Coal, No. 3 Pocahontas, (1131, 27' L.)	4	4½	351	6½	8' 11½"
Slate to bottom.....	0	5½	352	0	

Coal Test Boring (No. 122 on Map II).

Big Creek District, on east side of Big Creek, 2.0 miles northeast of Rift; well No. 56 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1491.8' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sand and boulders.....	13	0	13	0	
Slate, sandy.....	7	0	20	0	
Sandstone, slaty.....	8	0	28	0	
Slate	2	8	30	8	
Coal, No. 8 Pocahontas.....	0	8	31	4	31' 4"
Slate, sandy.....	6	8	38	0	
Slate	2	0	40	0	
Sandstone	2'				Flat Mountain.
Sandstone, slaty....10					
Sandstone	8				
Sandstone, slaty.... 7					
Sandstone	13				
Slate	42	5	122	5	
Coal .....0' 6"	2	9	125	2	93' 16"
Slate .....0 2					
Coal .....2 1					
Slate, sandy.....	14	10	140	0	
Slate	4	2	144	2	
Coal .....0' 6"	1	8	145	10	20' 8"
Slate .....0 6					
Coal .....0 8					
Slate, sandy.....	9	2	155	0	
Sandstone	11	0	166	0	
Sandstone, slaty.....	4	0	170	0	
Slate, sandy.....	5	3	175	3	
Coal, No. 6 Pocahontas.....	2	0	177	3	31' 5"
Slate	12	9	190	0	
Sandstone	6	0	196	0	
Slate	6	5	202	5	
Coal, No. 5 Pocahontas.....	1	9	204	2	26' 11"
Slate, sandy.....	9	10	214	0	
Slate	4	0	218	0	
Sandstone, slaty.....	30	0	248	0	
Slate	18	0	266	0	
Sandstone, slaty.....	15	0	281	0	
Slate	11	3	292	3	
Coal .....0' 3"	1	4	293	7	89' 5"
Slate .....0 4					
Coal, slaty..0 2					
Coal .....0 7					
Slate	6	5	300	0	
Sandstone, slaty.....	17	0	317	0	
Slate	10	5	327	5	
Coal	0	5	327	10	34' 3"
Slate	4	10	332	8	
Coal, No. 3 Pocahontas, (1155.9' L.)	3	2	335	10	8' 0"
Slate	6	2	342	0	
Sandstone, Lower Pocahontas.....	31	0	373	0	
Sandstone, hard.....	15	0	388	0	

Coal Test Boring (No. 123 on Map II).

Big Creek District, on branch of Big Creek, 2.8 miles N. 30° E. of Rift; well No. 19 by New River and Pocahontas Consolidated Coal Co.; authority, H. N. Eavenson; interval from Beckley, "War Creek" Coal to well—137.5'; elevation, 1613.6' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Surface soil.....	26	0	26	0
Sandstone	23	0	49	0
Coal, Little Fire Creek.....	0	8	49	8
Shale and fire clay.....	3	4	53	0
Sandstone	35	0	88	0
Coal .....0' 6" } No. 9				
Shale and coal 1 0 } Pocahontas..	1	6	89	6
Shale, sandy.....	2	6	92	0
Sandstone	45	0	137	0
Coal, No. 8 Pocahontas.....	0	6	137	6
Shale and fire clay.....	4	6	142	0
Shale, sandy.....	14	0	156	0
Sandstone, Flattop Mountain.....	74	0	230	0
Shale, dark.....	8	0	238	0
Sandstone, Pierpont.....	25	0	263	0
Slate, dark, shaly.....	39	0	302	0
Coal and shale (1' 3" coal), No. 6				
Pocahontas	2	7	304	7
Shale and fire clay.....	3	5	308	0
Shale, dark.....	13	0	321	0
Sandstone, Eckman.....	48	0	369	0
Coal and shale streaks, No. 5 Pocahontas	3	0	372	0
Shale and fire clay.....	3	0	375	0
Sandstone	15	0	390	0
Shale	100	0	490	0
Sandstone	10	0	500	0
Coal, No. 3 Pocahontas, (1112.6' L.)	1	0	501	0
Shale, dark.....	2	0	503	0
Sandstone, Lower Pocahontas.....	57	0	560	0
Sandstone, very hard.....	10	0	570	0
Shale and soapstone.....	10	0	580	0
Coal, No. 2 Pocahontas.....	0	3	580	3
Shale and soapstone.....	6	9	587	0
Shale, gray, sandy, with sulphur...	13	0	600	0
Sandstone, Vivian.....	30	0	630	0
Sandstone, very hard.....	11	0	641	0
Shale, dark.....	2	10	643	10
Coal, No. 1 Pocahontas	1	2	645	0
Shale and fire clay.....	2	0	647	0
Shale, dark, sandy.....	34	0	681	0
Sandstone, Landgraff.....	23	0	704	0
Sandstone, very hard, Keystone...	11	0	715	0
Shale, dark, and soapstone, North Fork	4	0	719	0
Coal, Simmons.....	0	8	719	8
Slate, dark.....	12	4	732	0
Sandstone, with red streaks.....	28	0	760	0

Coal Test Boring (No. 124 on Map II).

Big Creek District, at mouth of Mountain Fork, 3.6 miles north-east of Berwind; well No. 55 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1530.9' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface	12	0	12	0	
Sandstone	6	0	18	0	
Coal, No. 8 Pocahontas	0	2	18	2	18' 2"
Sandstone	14	10	33	0	
Slate	39	6	72	6	
Coal, No. 7 Pocahontas	1	3	73	9	55' 7"
Slate	0	6	74	3	
Sandstone, Pierpont	68	9	143	0	
Slate	29	0	172	0	
Sandstone	13	0	185	0	
Slate	28	6	213	6	
Coal, No. 4 Pocahontas	1	6	215	0	141' 3"
Slate	23	0	238	0	
Coal, No. 3 Pocahontas "Rider" ...	1	9	239	9	24' 9"
Slate	52	3	292	0	
Coal, No. 3 Pocahontas, (1235.7' L.)	3	3	295	3	55' 6"
Slate	12	9	308	0	
Sandstone, Lower Pocahontas	48	0	356	0	
Slate	22	0	378	0	
Sandstone, Vivian	57	0	435	0	
Slate	18	0	453	0	

Coal Test Boring (No. 127 on Map II).

Big Creek District, on Long Branch, 1.0 mile above mouth and 2.5 miles southwest of Filbert; well No. 51 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1637.9' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sand	13	0	13	0	
Sandstone	6	0	19	0	
Slate	37	0	56	0	
Coal, No. 5 Pocahontas	2	0	58	0	58' 0"
Slate	27	9	85	9	
Coal, No. 4 Pocahontas	7	9	93	6	35' 6"
Slate	16	6	110	0	
Sandstone, Upper Pocahontas	43	0	153	0	
Slate	6	6	159	6	
Coal, No. 3 Pocahontas, (1474.4' L.)	4	0	163	6	70' 0"
Slate	0	6	164	0	
Sandstone	1	0	165	0	

Coal Test Boring (No. 128 on Map II).

Big Creek District, on north side of Long Branch, 1.5 miles west of Filbert; well No. 52 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1718.94' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Surface	7 0	7 0	
Sandstone .....24' }			
Slate .....33 } Eckman..	97 0	104 0	
Sandstone .....40 }			
Coal, No. 4 Pocahontas.....	8 0	112 0	112' 0"
Slate	3 0	115 0	
Sandstone, Upper Pocahontas.....	47 0	162 0	
Slate	14 0	176 0	
Coal, No. 3 Pocahontas, (1538.9' L.)	4 0	180 0	68' 0"
Sandstone, Lower Pocahontas.....	61 0	241 0	
Slate	13 0	254 0	
Sandstone	9 0	263 0	
Slate	3 0	266 0	
Sandstone, Vivian.....	6 0	272 0	
Slate	7 0	279 0	
Coal, No. 1 Pocahontas.....	1 0	280 0	100' 0"
Slate	11 0	291 0	
Sandstone, Landgraff.....	32 0	323 0	

The following table shows the location of 11 scattered coal test borings in Big Creek District, the detailed logs of which the Survey was unable to obtain. Their elevations are shown in the table of borings given on a preceding page of this Chapter for McDowell County:

No. on Map II.	Location.
68	On Big Branch, 2 miles due west of Coalwood.
87	On Harmon Branch of Barrenshe, 1.5 miles northeast of Yukon.
89	On Harmon Branch of Barrenshe, 2.2 miles northeast of Yukon.
94	On south side of Dry Fork, 1.4 miles southwest of Yukon.
95	On west side of War Creek, 1 mile southwest of War.
102	On a south branch of Vall Creek, 1.6 miles westward from Hartwell.
116	On Upper Trace Fork of Big Creek, 1 mile northwest of Cucumber P. O.
117	On Upper Trace Fork of Big Creek, 1 mile north of Cucumber P. O.
118	One-half mile southwest of Cucumber P. O.
119	One-half mile northeast of Cucumber P. O.
131	In Tazewell County, 1.1 miles west of the mouth of Horsepen Creek.

The following is the record of a very deep diamond drill boring in the Bearwallow Knob region of Virginia, just across the State Line from McDowell County, which contains some valuable information on the stratigraphic succession and corroborates in a marked manner the General Section of the Pottsville Measures given on pages 51-60. It starts about 460 feet below the top of the Panther ("Dismal") Conglomerate, as determined with aneroid by the writer, flush with an opening in what appears to be Iaeger Coal, and exhibits the great expansion of the New River Group above the Sewell ("Davy") Coal that has taken place in this region:

Coal Test Boring.

Buchanan County, Virginia, on Sang Camp Branch, 3.6 miles S. 65° W. of Bearwallow Knob; well by Pocahontas Mining Corporation; authority, H. N. Eavenson; elevation, 2190' B.

	Thickness Ft. In.	Total Ft. In.	
Sand and boulders (Coal, Iaeger, flush with top of boring, 29½", with ½" bone 2" above bottom)	23 0	23 0	
Sand, shale.....	20 0	43 0	
Sandstone, Lower Iaeger.....	35 0	78 0	
Sand, shale, Lower Iaeger.....	70 0	148 0	
Shale, blue.....	1 0	149 0	
Coal.....	0 10	149 10	149' 10"
Fire clay.....	0 8	150 6	
Sandstone, Harvey Conglomerate..	61 0	211 6	
Shale, dark.....	0 1	211 7	
Coal, Castle.....	1 1	212 8	62' 10"
Shale, dark.....	6 2	218 10	
Sandstone, Guyandot.....	33 6	252 4	
Shale, sandstone partings.....	28 0	280 4	
Sand, shale, black.....	23 0	303 4	
Sandstone.....	9 8	313 0	
Sand shale, blue.....	10 0	323 0	
Shale, soapstone partings.....	13 0	336 0	
Sand shale, blue.....	28 0	364 0	
Soapstone, shale partings.....	8 0	372 0	
Sand shale, black.....	10 0	382 0	
Shale, dark.....	2 4	384 4	
Coal.....1' 0" }			
Shale, dark.0 9 } Sewell "B"....	2 3	386 7	173' 11"
Coal.....0 6 }			
Shale, dark.....	6 0	392 7	
Shale, light.....	4 0	396 7	
Sandstone, with shale partings....	25 0	421 7	
Shale, sandstone partings.....	30 0	451 7	

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Shale, black, sandy.....	12	5	464	0	
Shale, dark.....	1	6	465	6	
Slate, coal					
partings ..0' 6"					
Coal .....0 2					
Shale, dark...0 2	Sewell "A"..	5 2	470	8	84' 1"
Coal .....0 3					
Shale, black...3 2					
Coal .....0 11					
Shale, dark.....	0	6	471	2	
Shale, light.....	11	0	482	2	
Sandstone, Lower Guyandot.....	42	10	525	0	
Shale, blue.....	11	0	536	0	
Slate, black.....	0	4	536	4	
Coal, Sewell.....	1	10	538	2	67' 6"
Shale, dark.....	1	3	539	5	
Sandstone, shale partings.....	11	0	550	5	
Sandstone	13	0	563	5	
Shale, dark, coal partings.....	4	7	568	0	
Coal	0	4	568	4	30' 2"
Fire clay.....	0	8	569	0	
Shale, sandy.....	2	2	571	2	
Sandstone, Welch.....	19	0	590	2	
Shale, blue.....	4	7	594	9	
Coal, Welch, (1595' B.).....	0	9	595	6	27' 2"
Fire clay.....	1	6	597	0	
Sand shale, black.....	2	6	599	6	
Sandstone, Upper Raleigh.....	85	4	684	10	
Shale, b'ack.....	4	6	689	4	
Coal, Little Raleigh.....	2	0	691	4	95' 10"
Fire clay.....	0	8	692	0	
Shale, dark.....	8	0	700	0	
Sandstone, shale partings.....	32	0	732	0	
Shale, black, sandy.....	14	0	746	0	
Shale, dark.....	0	8	746	8	
Coal, Beckley, "War Creek".....	2	4	749	0	57' 8"
Shale, dark.....	3	0	752	0	
Shale, black.....	13	0	765	0	
Sand shale, dark.....	80	0	845	0	
Shale, dark.....	12	0	857	0	
Coal .....2' 6"					
Slate .....0 1					
Coal .....0 6					
Bone and slate.0 6					
Coal .....2 8	Fire Creek..	10 6	867	6	118' 6"
Slate .....0 4					
Bone and coal.2 10					
Coal .....1 1					
Fire clay.....	3	0	870	6	
Shale, dark.....	3	6	874	0	
Shale, light, sandy.....	3	0	877	0	
Sandstone, Pineville.....	38	0	915	0	
Slate, light, sandy.....	30	0	945	0	
Slate, black.....	1	0	946	0	

	Thickness		Total		
	Ft. In.		Ft. In.		
Coal, Little Fire Creek.....	0	3	946	3	78' 9"
Fire clay.....	1	6	947	9	
Shale, light.....	3	0	950	9	
Sandstone, very hard.....	30	0	980	9	
Sandstone, shale parting.....	5	0	985	9	
Sandstone	47	3	1033	0	
Coal .....0' 7" }					
Shale, dark.0 3 }	No. 9 Pocahontas		1	2	87' 11"
Coal .....0 4 }					
Shale, dark.....	0	10	1035	0	
Shale, light, sandy.....	3	0	1038	0	
Sandstone	22	0	1060	0	
Shale, dark.....	1	4	1061	4	
Coal	0	8	1062	0	27' 10"
Fire clay.....	1	0	1063	0	
Shale, light, sandy.....	2	0	1065	0	
Sandstone	18	0	1083	0	
Shale, light.....	4	0	1087	0	
Slate, coal partings.....	0	6	1087	6	
Shale, light.....	1	0	1088	6	
Shale, dark.....	0	6	1089	0	
Bone	0	1	1089	1	
Shale, dark.....	0	11	1090	0	
Coal .....0 2" }					
Shale, dark.....0 4 }			0	8	28' 8"
Coal .....0 2 }					
Shale, dark.....	0	2	1090	10	
Shale, light, sandy.....	3	2	1094	0	
Sandstone, shale partings.....	14	6	1108	6	
Shale, dark.....	3	6	1112	0	
Coal, No. 8 Pocahontas.....	0	8	1112	8	22' 0"
Fire clay.....	0	6	1113	2	
Shale, light, sandy.....	11	10	1125	0	
Sandstone, gray, Flattop Mountain.	56	0	1181	0	
Shale, dark.....	2	0	1183	0	
Sandstone and shale.....	3	0	1186	0	
Shale, sandy, black.....	6	6	1192	6	
Shale, blue.....	8	0	1200	6	
Shale, dark.....	0	6	1201	0	
Coal, No. 7 Pocahontas.....	1	0	1202	0	89' 4"
Fire clay.....	0	6	1202	6	
Shale, blue.....	12	6	1215	0	
Sandstone, gray, Pierpont.....	30	0	1245	0	
Shale, dark.....	49	0	1294	0	
Coal, No. 6 Pocahontas.....	1	0	1295	0	
Slate, dark.....	0	2	1295	2	
Fire clay.....	4	0	1299	2	
Shale, light, sandy.....	1	8	1300	10	
Shale, dark.....	4	0	1304	10	
Fire clay.....	3	0	1307	10	
Shale, sandy, black.....	4	6	1312	4	
Sandstone, gray.....	13	0	1325	4	
Shale, blue, sandy.....	9	0	1334	4	
Coal, No. 5 Pocahontas.....	1	2	1335	6	133' 6"

	Thickness		Total	
	Ft. In.		Ft. In.	
Shale, light.....	1	6	1337	0
Sandstone, gray.....	6	6	1343	6
Shale, black, sandy.....	6	6	1350	0
Shale, gray, sandy.....	9	0	1359	0
Shale, dark.....	2	0	1361	0
Bone .....0' 2" }				
Coal .....0 10 }				
Fire clay...1 0 }	No. 4 Pocahontas 10 10		1371 10	36' 4"
Shale, dark..8 6 }				
Coal .....0 4 }				
Shale, dark.....	1	2	1373	0
Sandstone, shale partings.....	5	0	1378	0
Shale, sandstone partings.....	12	0	1390	0
Shale, blue.....	8	0	1398	0
Shale, dark.....	4	0	1402	0
Coal, No. 3 Pocahontas "Rider"...	0	4	1402	4
Fire clay.....	1	8	1404	0
Sandstone, Upper Pocahontas.....	60	0	1464	0
Coal .....1' 0" }				
Slate .....0 1 }	No. 3 Pocahontas 2 3		1466 3	63' 11"
Coal .....0 11 }				
Bone .....0 3 }				
Fire clay.....	2	0	1468	3
Shale, sandy.....	16	0	1484	3
Sandstone to bottom.....	15	9	1500	0

Detailed Records in Adkin District.

Adkin District (McDowell), lying immediately east of that last described, has been quite thoroughly prospected with coal test borings in its northwestern half, a total of 41 having been drilled within its borders. As shown in the page references in the following table, the detailed logs of 11 have been published in Volume II(A) of the State Geological Survey Reports, in which the correlations of the principal coal beds are fairly accurate:

Page References to Boring Records in Former State Reports.

No. on Map II.	Location.	Page of Vol. II (A).
137	On Rock Narrows Branch, 1.3 mi. S. W. of Jed	124
141	On Sugarcamp Branch, 0.7 mi. N. W. of Wilcoe	122
143	On Sugarcamp Branch, 1.1 mi. West of Wilcoe	123
144	On Grape Branch, $\frac{1}{2}$ mi. N. E. of Wilcoe..	121
145	On Grape Branch, 0.6 mi. N. E. of Wilcoe..	118
146	On Grape Branch, 0.6 mi. East of Wilcoe..	119
151	On Mill Creek, 1.3 mi. West of Gary.....	113
159	On Adkin Branch, $1\frac{1}{4}$ mi. N. E. of Gary...	114
163	On Adkin Branch, 1.5 mi. N. E. of Gary....	116
164	On Adkin Branch, 1.9 mi. N. E. of Gary....	115
167	On Right Fork of Sandlick Creek, 1.8 mi. S. W. of Gary.....	112

The detailed records of 12 others, scattered over the north-west portion of the District, will now be given in the order of their serial or map numbers.

Coal Test Boring (No. 133 on Map II).

Adkin District, on east side of Tug Fork, at Jed; well No. 1 by Jed Coal & Coke Co.; elevation, 1410' B.

	Thickness Ft. In.	Total Ft. In.	
Surface	18 0	18 0	
Rotten sandstone.....	8 4	26 4	
Shale slate.....	6 3	32 7	
Sandstone	4 3	36 10	
Sandstone, broken.....	26 8	63 6	
Sandstone	7 7	71 1	
Sand slate.....	4 2	75 3	
Sandstone	6 10	82 1	
Slate	1 9	83 10	
Dark sandstone slate.....	7 2	91 0	
Sandstone	48 8	139 8	
Sandstone 4' 2" } Pierpont..	35 2	174 10	
Hard seamy sandstone ..31 0 }			
Slate shale.....	6 7	181 5	
Coal, No. 6 Pocahontas.....	0 2	181 7	181' 7"
Shale slate.....	5 6	187 1	
Sandstone, streaks of slate, Eckman	37 4	224 5	
Slate and coal, No. 5 Pocahontas...	0 5 $\frac{1}{2}$	224 10 $\frac{1}{2}$	43' 3 $\frac{1}{2}$ "
Fire clay and slate.....	5 3 $\frac{1}{2}$	230 2	
Sandstone	10 0	240 2	

Coal Test Boring (No. 134 on Map II).

Adkin District, on west side of Tug Fork, at Jed; well No. 2 by Jed Coal & Coke Co.; elevation, 1340' L.

	Thickness		Total
	Ft.	In.	Ft. In.
Surface	12	5	12 5
Rotten sandstone.....	7	10	20 3
Shale, slate	3	0	23 3
Shale, slate with little coal in.....	3	9	27 0
Slate	4	0	31 0
Sandstone	3	5	34 5
Sandstone, very hard.....	36	7	71 0
Slate	8	5	79 5
Sandstone, slaty.....	11	7	91 0
Dark sandstone, slaty.....	8	8	99 8
Sandstone and slate.....	5	8	105 4
Sandstone	32	6	137 10
Hard seamy sandstone.....	19	0	156 10
Slate	1	4	158 2
Hard seamy sandstone.....	9	10	168 0
Slate	2	6	170 6
Bony coal, slaty, No. 5 Pocahontas	0	4	170 10
Slate	4	8	175 6
Sandstone, streaks of slate.....	27	3	202 9
Sandstone, streaks of slate, brownish	8	3	211 0
Sandstone and slate, brownish.....	8	2	219 2
Sandstone, broken.....	1	7	220 9
Sandstone and slate.....	19	3	240 0

170' 10"

Coal Test Boring (No. 135 on Map II).

Adkin District, at mouth of Rock Narrows Branch, $\frac{1}{2}$ mile south of Jed; well No. 4 by Jed Coal & Coke Co.; elevation, 1345' B.

	Thickness		Total
	Ft.	In.	Ft. In.
Surface, sand, and ground.....	11	0	11 0
Sandstone, broken and rotten.....	10	8	21 8
Sandstone, broken.....	5	4	27 0
Sandstone and slate.....	1	3	28 3
Slate	7	10	36 1
Slate, streaks of sandstone.....	10	11	47 0
Slate, very soft.....	12	0	59 0
Sandstone and shale mixed.....	10	8	69 8
Sandstone	18	3	87 11
Sandstone, little seams of coal....	1	3	89 2
Sandstone	13	10	103 0
Sandstone and slate mixed.....	7	8	110 8
Shale, sandy.....	15	0	125 8
Black slate, very soft.....	5	11	131 7
Fire clay, sandy.....	5	7	137 2
Sand slate	1	3	138 5
Sandstone	27	0	165 5
Shale	1	5	166 10
Sandstone	23	0	189 10



PLATE XVII—Showing marine fossiliferous North Fork Shale, flush with N. & W. R. R. grade at North Fork, McDowell County; thin lenses of iron ore visible.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Seamy sandstone.....	9	4	199	2	
Sandstone	4	0	203	2	
Coal, bony coal	1' 3"	3"	211	4	211' 4"
and slate.....					
Slate					
Coal					
Slate					
Coal					
Bone and slate...0 3	No. 4	Pocahontas	8 2	211 4	
Coal					
Fire clay	3	2	214	6	

Coal Test Boring (No. 136 on Map II).

Adkin District, on Rock Narrows Branch, 0.8 mile southwest of Jed; well No. 36 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1437.93' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Clay and boulders.....	19	0	19	0	
Sandstone, Pineville.....	30	9	49	9	
Coal, No. 9 Pocahontas.....	0	9	50	6	50' 6"
Slate	2	6	53	0	
Sandstone, broken.....	27	0	80	0	
Sandstone, broken, with slate part-					
ings	19	0	99	0	
Sandstone, Flattop Mountain.....	87	0	186	0	
Slate, sandy.....	13	0	199	0	
Sandstone, Pierpont.....	17	1	216	1	
Coal, No. 6 Pocahontas.....	1	1	217	2	166' 8"
Slate	4	8	221	10	
Sandstone, Eckman.....	43	2	265	0	
Slate, sandy.....	32	6	297	6	
Sandstone	4	0	301	6	
Slate	7	6	309	0	
Sandstone, Eckman.....	30	0	339	0	
Sandstone, dark.....	7	0	346	0	
Sandstone, light.....	1	0	347	0	
Sandstone	3	10	350	10	
Sandstone, sulphur balls.....	1	0	351	10	
Coal, slate part-	0' 8"	8"	359	6	142' 4"
ings					
Coal	7	0			
Slate	2	6	362	0	
Slate, sandy.....	2	0	364	0	
Sandstone	7	0	371	0	
Sandstone, with slate streaks, Up-					
per Pocahontas.....	34	0	405	0	
Slate	4	4	409	4	
Coal, No. 3 Pocahontas, (1023.4' L.)	5	1	414	5	54' 11"
Slate	2	0	416	5	
Sandstone	7	7	424	0	

Coal Test Boring (No. 138 on Map II).

Adkin District, on Harris Branch, 0.7 mile southwest of Jed; well No. 3 by Jed Coal & Coke Co.; elevation, 1360' B.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Surface, boulders and sand.....	5	0	5	0	
Slate	17	2	22	2	22' 8"
Coal, slaty.....	0	6	22	8	
Fire clay.....	3	4	26	0	
Shale	2	5	28	5	
Sandstone, very hard.....	15	11	44	4	
Slate	0	3	44	7	22' 7"
Coal, No. 6 Pocahontas.....	0	8	45	3	
Fire clay and shale.....	8	1	53	4	
Sandstone, Eckman.....	86	6	139	10	
Hard seamy sandstone.....	26	4	166	2	
Slate	8	8	174	10	129' 11"
Coal, No. 4 Pocahontas.....	0	4	175	2	
Black slate.....	2	6	177	8	
Sand slate.....	18	0	195	8	
Black slate.....	2	0	197	8	
Fire clay.....	7	10	205	6	64' 10"
Shale	3	3	208	9	
Dark sandstone, very fine grained..	21	3	230	0	
Sandstone, hard, (6" left in hole)...	10	0	240	0	

Coal Test Boring (No. 152 on Map II).

Adkin District, on Right Fork of Mill Creek, 1½ miles west of Kennon; well No. 18 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1544.51' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Sand	12	0	12	0	245' 11"
Sandstone, Flattop Mountain.....	30	0	42	0	
Sand slate.....	14	9	56	9	
Sandstone	0	3	57	0	
Sand slate.....	14	0	71	0	
Sandstone, Pierpont.....	74	5	145	5	
Sand slate.....	30	7	176	0	
Unrecorded	8	0	184	0	
Sandstone, Eckman.....	58	0	242	0	
Sand shale.....	1	2	243	2	
Coal, No. 4 Pocahontas.....	2	9	245	11	80' 10"
Fire clay.....	1	1	247	0	
Sand shale.....	0	8	247	8	
Sandstone	0	4	248	0	
Sand slate.....	2	1	250	1	
Sandstone, Upper Pocahontas.....	75	5	325	6	
Coal, No. 3 Pocahontas, (1217.7' L.)	1	3	326	9	
Fire clay.....	1	0	327	9	
Sandstone	1	3	329	0	

Coal Test Boring (No. 153 on Map II).

Adkin District, on Left Fork of Mill Creek, 2.0 miles southwest of Gary; well No. 16 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1571.1' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Sand and gravel.....	23 0	23 0	
Sand slate.....	5 7	28 7	
Sandstone	38 4	66 11	
Sand slate.....	1 1	68 0	
Sandstone, Eckman	115 0	183 0	
Sand slate.....	5 5	188 5	
Coal, No. 4 Pocahontas	8 1	196 6	196' 6"
Fire clay.....	3 11	200 5	
Sandstone	8 3	208 8	
Sand slate.....	1 0	209 8	
Sandstone, Upper Pocahontas	37 4	247 0	
Slate	9 7	256 7	
Coal .....0' 4" }			
Slate .....0 3 }			
Sand slate 0 10 }			
Slate .....0 2 }	No. 3 Pocahontas	5 2	261 9
Coal .....3 7 }	(1309.3' L.)		65' 3"
Fire clay.....	4 0	265 9	
Sand slate.....	5 3	271 0	
Sandstone	2 0	273 0	

Coal Test Boring (No. 166 on Map II).

Adkin District, near top of mountain, 0.7 mile northwest of Thorpe; well No. 26 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1983.88' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Clay and boulders.....	13 0	13 0	
Sandstone	19 9	32 9	
Coal, slaty, No. 9 Pocahontas	2 0	34 9	34' 9"
Sandstone	4 3	39 0	
Slate	2 9	41 9	
Coal, No. 8 Pocahontas	0 5	42 2	7' 5"
Slate	9 10	52 0	
Sandstone, Flattop Mountain	76 0	128 0	
Slate, sandy, Rift	32 7	160 7	
Coal, No. 7 Pocahontas	0 10	161 5	119' 3"
Slate	2 7	164 0	
Sandstone	7 0	171 0	
Slate	2 0	173 0	
Sandstone, Pierpont	26 0	199 0	
Slate	2 0	201 0	
Sandstone	8 6	209 6	
Slate	2 6	212 0	
Sandstone	18 0	230 0	
Sandstone, slaty.....	28 0	258 0	
Sandstone	3 0	261 0	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Sandstone, slaty, Eckman	59	0	320	0
Coal, No. 5 Pocahontas	1	8	321	8
Slate	5	8	327	4
Coal, slaty. 6' 4" } No. 4 Pocahontas	11	0	338	4
Coal .....4 8 }				
(1645.5' L.)..	0	10	339	2
Slate	54	10	394	0
Sandstone, Upper Pocahontas	9	0	403	0
Slate, sandy.....	14	10	417	10
Slate	8	6	426	4
Coal .....0' 5" }				
Slate .....2 2 }				
No. 3 Pocahontas	1	8	428	0
Coal .....5 11 }				
(1557.6' L.)				
Slate				

Coal Test Boring (No. 168 on Map II).

Adkin District, on ridge 1.0 mile southeast of Gary; well No. 21 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 2004.1' L.

	Thickness		Total	
	Ft.	In.	Ft.	In.
Gravel and sand.....	8	0	8	0
Sandstone, slaty.....	6	0	14	0
Sandstone	2	9	16	9
Coal, No. 9 Pocahontas	1	1	17	10
Sandstone	37	2	55	0
Slate, sandy.....	15	0	70	0
Sandstone	45	0	115	0
Sandstone, slaty.....	9	0	124	0
Sandstone, broken..21' } Flattop	38	0	162	0
Sandstone .....17 }				
Slate, Rift	20	1	182	1
Coal, No. 7 Pocahontas	0	8	182	9
Slate, sandy.....	7	3	190	0
Slate	5	0	195	0
Sandstone, Pierpont	38	0	233	0
Slate	27	0	260	0
Sandstone	2	0	262	0
Slate	3	0	265	0
Sandstone	3	0	268	0
Slate	6	0	274	0
Sandstone, Eckman	32	0	306	0
Slate	2	0	308	0
Sandstone	2	0	310	0
Sandstone, broken.....	12	0	322	0
Slate	3	0	325	0
Sandstone	9	4	334	4
Coal .....0' 4" }	2	10	337	2
Sandstone, slaty ..0 9 }				
No. 5 Pocahontas	2	10	340	0
Coal .....1 9 }				
Sandstone, slaty.....	8	0	348	0
Slate, sandy.....	4	0	352	0
Sandstone	4	7	356	7
Slate				

	Thickness		Total				
	Ft.	In.	Ft.	In.			
Coal, No. 4 Pocahontas.....	0	8	357	3	20' 1"		
Slate	1	9	359	0			
Sandstone, slaty.... 3'	57	0	416	0	}		
Sandstone, broken..16						Upper	
Sandstone .....12							Pocahontas
Sandstone, hard..... 8							
Sandstone .....18							
Slate, sandy.....	4	0	420	0			
Slate	10	5	430	5			
Coal, No. 3 Pocahontas, (1570.6' L.)	3	1	433	6	76' 3"		
Slate	3	6	437	0			
Sandstone, Lower Pocahontas.....	65	0	502	0			
Slate	18	0	520	0			
Slate, sandy.....	4	1	524	1			
Coal, No. 1 Pocahontas.....	1	6	525	7	93' 1"		
Slate, sandy.....	1	5	527	0			
Sandstone, slaty.....	8	5	535	5			

Coal Test Boring (No. 169 on Map II).

Adkin District, 1.0 mile northeast of Elbert; well No. 29 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1867' L.

	Thickness		Total		
	Ft.	In.	Ft.	In.	
Clay and boulders.....	8	4	8	4	
Sandstone, Pierpont	24	8	33	0	
Slate, sandy.....	7	0	40	0	
Slate	11	3	51	3	
Coal, No. 6 Pocahontas	0	6	51	9	51' 9"
Slate	0	10	52	7	
Sandstone .. 46' 5"	93	7	146	2	}
Unrecorded .. 6 0					
Slate 3 0					
Sandstone ...38 2	Eckman				
Coal, No. 5 Pocahontas	0	7	146	9	95' 0"
Sandstone	2	3	149	0	
Slate	4	0	153	0	
Coal and slate ..4' 1"	11	3	164	3	}
Coal .....0 8					
Slate .....0 5					
Coal .....5 4	No. 4 Poca- hontas				
Slate	2	6	166	9	17' 6"
Sandstone	58	3	225	0	
Slate	5	0	230	0	
Coal .....0' 4"	6	6	236	6	}
Slate .....2 6					
Coal .....3 8					
No. 3 Pocahontas (1630.5' L.)					
Slate	4	0	240	6	72' 3"
Sandstone	6	6	247	0	

Coal Test Boring (No. 172 on Map II).

Adkin District, at head of Belcher Branch, 2.0 miles southeast of Gary; well No. 30 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 1887.9' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Clay, sand and boulders.....	15 0	15 0	
Slate	4 0	19 0	
Sandstone, hard, with slate partings..21'	Eckman.. 103 0	122 0	
Sandstone .....56			
Sandstone, slaty....17			
Sandstone .....9			
Slate	17 5	139 5	
Slate and coal.1' 9"	No. 4 Poca- hontas 6 7	146 0	146' 0"
Coal .....3 6			
Slate .....0 3			
Coal .....1 1			
Sandstone, Upper Pocahontas.....	63 0	209 0	
Slate	13 9	222 9	
Coal .....0' 3"	No. 3 Pocahontas (1659.1' L.)	228 9	82' 9"
Slate .....1 7			
Coal .....2 10			
Coal, slaty..1 4			
Sandstone, slaty.....	3 3	232 0	

Coal Test Boring (No. 173 on Map II).

Adkin District, 1.7 miles east of Elbert; well No. 31 by United States Coal & Coke Co.; authority, H. N. Eavenson; elevation, 2080' L.

	Thickness	Total	
	Ft. In.	Ft. In.	
Clay and boulders.....	12 0	12 0	
Sandstone	18 0	30 0	
Slate	3 0	33 0	
Sandstone, Pierpont.....	50 0	83 0	
Sandstone and coal, No. 6 Pocahontas	2 0	85 0	85' 0"
Sandstone	4 0	89 0	
Coal	0 3	89 3	
Sandstone	1 9	91 0	
Slate	1 0	92 0	
Sandstone, Eckman.....	52 0	144 0	
Slate	5 0	149 0	
Coal, No. 5 Pocahontas.....	3 5	152 5	67' 5"
Slate	1 7	154 0	
Sandstone	4 10	158 10	
Slate	1 0	159 10	
Coal .....2' 7"	No. 4 Poca- hontas 6 7	166 5	14' 0"
Slate .....2 4			
Coal and slate 1 8			
Slate	5 7	172 0	
Sandstone, Upper Pocahontas.....	33 0	205 0	
Slate	14 0	219 0	
Sandstone	2 0	221 0	

	Thickness		Total	
	Ft.	In.	Ft.	In.
Slate	8	4	229	4
Coal, No. 3 Pocahontas, (1846.5' L.)	4	2	233	6
Slate	2	0	235	6
Slate, sandy.....	6	6	242	0

67' 1"

The following table shows the location of 18 other borings in Adkin District, the detailed records of which were not obtained. Their elevations and the thicknesses only of the Nos. 3 and 4 Pocahontas Coals are exhibited in the table of boring records for McDowell County, pages 292-3:

No. on Map II.	Location of Boring.
139	On Mitchell Branch, 1.6 miles N. E. of Wilcoe.
140	On Sugarcamp Branch, 0.7 mile northward from Wilcoe.
142	On branch of Sugarcamp Branch, 0.5 mile west of Wilcoe.
147	On Grape Branch, 0.9 mile east of Wilcoe.
148	On Grape Branch, $\frac{3}{4}$ mile southeast of Wilcoe.
149	On east bank of Tug Fork, at Wilcoe.
150	On Mill Creek, 0.5 mile southwest of Wilcoe.
154	On southeast edge of Wilcoe.
155	One-half mile southeast of Wilcoe.
156	Gary, 0.4 mile northwest of.
157	On west hillside of Adkin Branch, 0.6 mile north of Gary.
158	On east hillside of Adkin Branch, 1 mile northeast of Gary.
160	On Adkin Branch, 0.9 mile northeast of Gary.
161	On east hillside of Adkin Branch, $1\frac{1}{4}$ miles northeast of Gary.
162	On east hillside of Adkin Branch, 1.4 miles N. E. of Gary.
165	On ridge, 1.5 miles northeast of Gary.
170	On Belcher Branch, $\frac{3}{4}$ mile southwest of Thorpe.
171	On Be'cher Branch, 0.7 mile south of Thorpe.

MINABLE COALS OF THE ALLEGHENY SERIES.

NO. 5 BLOCK—LOWER KITTANNING COAL.

The No. 5 Block Coal, the outcrop of which is shown on Map II, is confined to the summits of the high knobs in Buffalo Mountain along the northwest edge of Oceana District and Burning Rock Knob, in the northeast edge of Clear Fork District, Wyoming County. No prospects or crop exposures of this bed were observed, but it is quite certain that it is present in minable dimensions and regularity at the points in question, since it is very persistent and a valuable deposit of fuel in the adjoining areas of Logan and Boone Counties.

Quantity of No. 5 Block Coal Available.

Figure 5 shows the region to which the No. 5 Block Coal is confined. The following table, the acreage of which was determined with planimeter by Gawthrop from Map II, shows the probable amount of this bed available for future mining operations. The thickness assumed—4 feet—is the same as that used for this seam by Hennen¹ and Reger in the immediately adjoining area of Triadelphia District, Logan County:

¹Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 339; 1914.

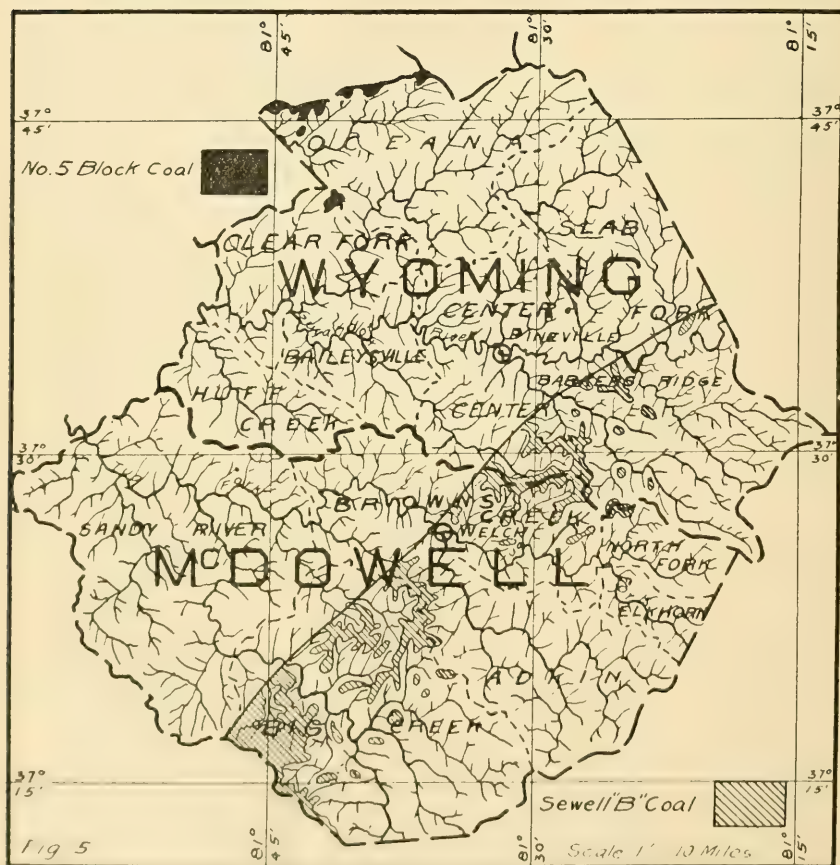


Figure 5. Showing Approximate Minable Areas of the No. 5 Block and Sewell "B" Coals (See explanations in Author's Preface).

Probable Amount of No. 5 Block Coal.

Wyoming County Only. Districts.	Thickness of Coal Assumed in Feet	Square Miles	Acres	Cubic Feet of Coal	Short Tons of Coal
Oceana	4	0.24	154	26,832,960	1,073,318
Clear Fork.....	4	0.05	32	5,575,680	223,027
Totals		0.29	186	32,408,640	1,296,345

MINABLE COALS OF THE KANAWHA GROUP.**THE STOCKTON COAL.**

The **Stockton Coal**, described briefly in Chapter V, pages 138-9, like the bed last mentioned, is also confined to the same two Districts of Wyoming County—Oceana and Clear Fork—near the summits of Buffalo, Guyandot and Huff Mountains. On page 138, a section of this seam is given at a country bank—No. 171 on Map II—the only exposure observed in the area. Figure 6 shows its approximate minable area, along with that for the No. 9 Pocahontas Coal.

Quantity of Stockton Coal Available.

Figure 6 exhibits the region to which the Stockton Coal is confined. The following estimate, based on the evidence of the opening last mentioned and that found in the adjoining portion of Triadelphia District, Logan County, by Hennen² and Reger, is perhaps approximately correct. The acreage was determined by Gawthrop by interpolation between the No. 5 Block and Campbell Creek (No. 2 Gas) Coals, the detailed outcrops of which are given on Map II:

²Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 346; 1914.

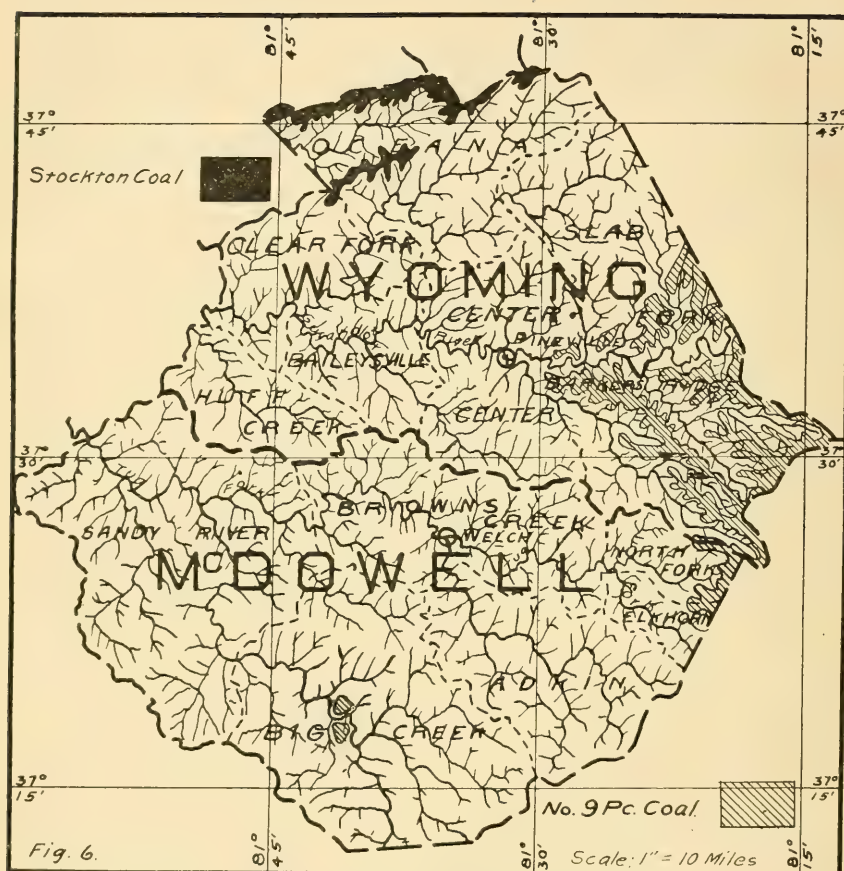


Figure 6.—Showing Approximate Mineable Areas of the Stockton and No. 9 Pocahontas Coals (See explanations in Author's Preface).

Probable Amount of Stockton Coal.

Wyoming County Only. Districts.	Thickness of Coal Assumed in Feet	Square Miles	Acres	Cubic Feet of Coal	Short Tons of Coal
Occana	4	2.0	1,280	223,027,200	8,921,088
Clear Fork	4	0.5	32	55,756,800	2,230,272
Totals		2.5	1,312	278,784,000	11,151,360

THE COALBURG COAL.

The Coalburg Coal, described briefly in Chapter V, page 139, like the Stockton and No. 5 Block, is confined to Oceana and Clear Fork Districts, Wyoming County, slightly lower down from the crests of Buffalo, Guyandot and Huff Mountains. Not a single exposure of this bed either at prospects or crop was observed, but it is quite certain to be present in the regions in question with a good thickness of coal, since it is very persistent and a valuable deposit of fuel in the immediately adjoining portions of Logan and Boone Counties.

Quantity of Coalburg Coal Available.

Figure 7 exhibits the approximate minable area of the **Coalburg Coal**, as also that for the No. 7 Pocahontas bed. In the following estimate, the acreage was determined by Gawthrop by interpolation between the No. 5 Block and the Campbell Creek (No. 2 Gas) Coals, the detailed outcrops of which are given on Map II. The thickness assumed—4 feet—is the same as that assumed for this bed by Hennen³ and Reger in the immediately adjoining portion of Triadelphia District, Logan County:

Probable Amount of Coalburg Coal.

Wyoming County Only. Districts.	Thickness of Coal Assumed in Feet	Square Miles	Acres	Cubic Feet of Coal	Short Tons of Coal
Oceana	4	4.0	2,560	446,054,400	17,842,176
Clear Fork.....	4	1.0	640	111,513,600	4,460,544
Totals		5.0	3,200	557,568,000	22,302,720

³Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, p. 381; 1914.

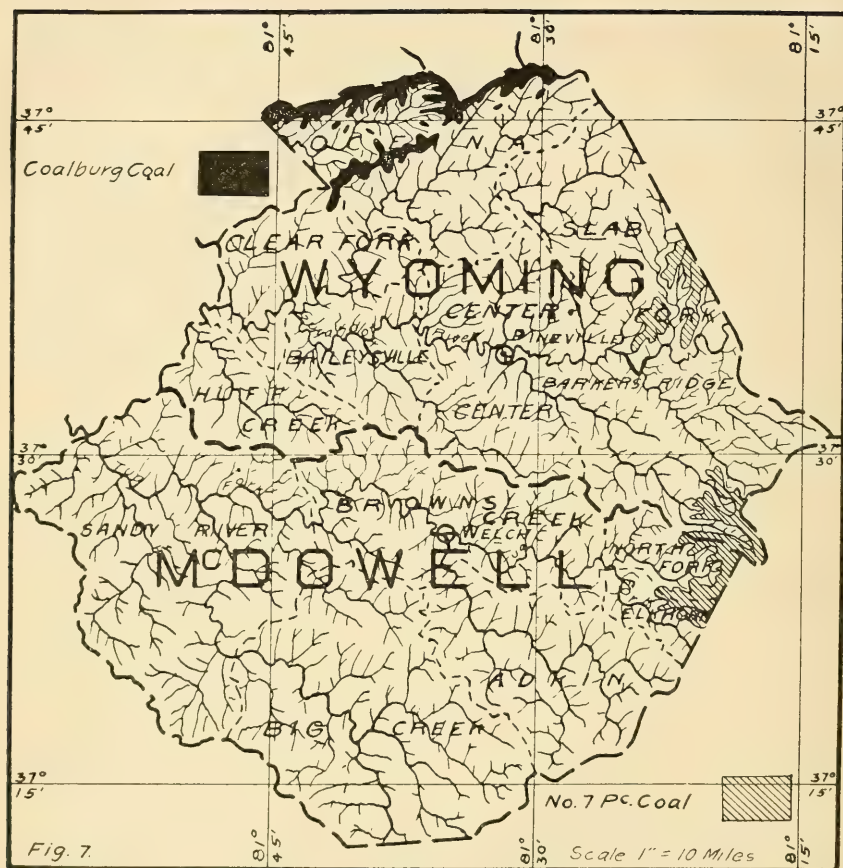


Figure 7.—Showing Approximate Movable Area of the Coalburg and No. 7 Pocahontas Coals (See explanations in Author's Preface).

THE WINIFREDE COAL.

The Winifrede Coal, described briefly in Chapter V, pages 140-1, is confined to a slightly larger area of Oceana and Clear Fork Districts of Wyoming County than the bed last discussed, at a lower elevation in Buffalo, Guyandot and Huff Mountains. Not a single exposure either at crop or in prospect openings was observed for this seam, owing to its high elevation and the forest conditions prevailing in the region of its occurrence. However, it is present in fair thickness in the immediately adjoining portions of Logan and Boone Counties,

as determined by Hennen⁴ and Reger, and Krebs⁵, respectively, so that it is reasonable to assume that it has the same dimensions in the adjoining portions of the two Districts in question.

Quantity of Winifrede Coal Available.

Figure 8 exhibits the approximate minable area of the Winifrede Coal, along with that for the No. 6 Pocahontas bed. Based solely on the evidence in the Reports last cited, the following estimate is made of the probable amount of this seam.

⁴Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 391-401; 1914.

⁵C. E. Krebs, Boone County Report, W. Va. Geol. Survey; 1915.

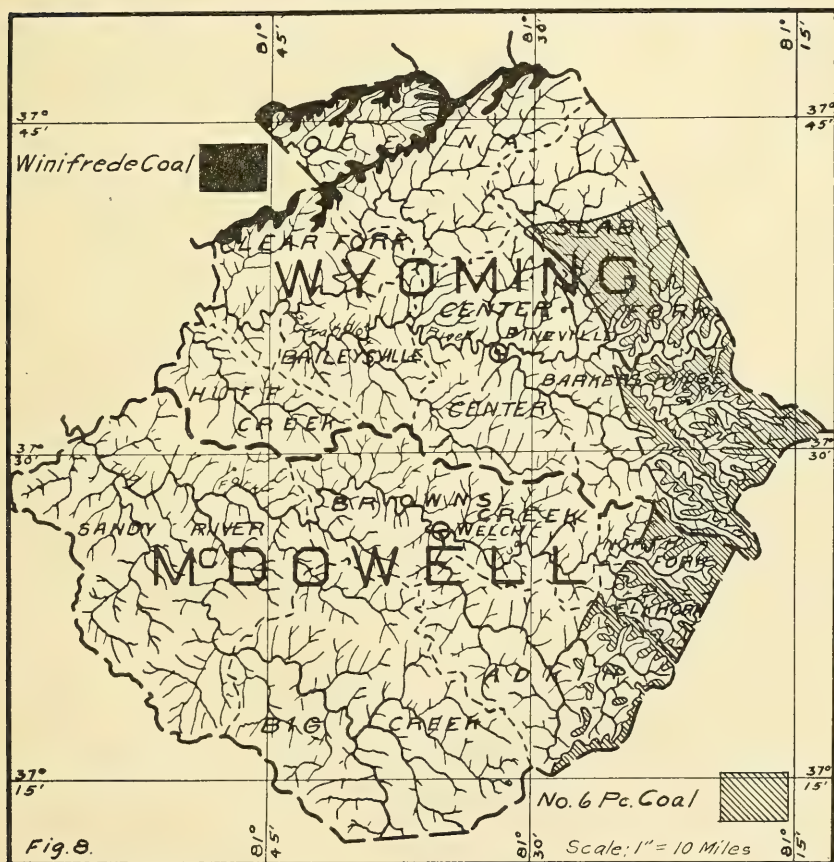


Figure 8.—Showing Approximate M-nable Area of the Winifrede and No. 6 Pocahontas Coals (See explanations in Author's Preface).

As its outcrop is not shown on Map II, the acreage is interpolated by Gawthrop from that of the No. 5 Block and Campbell Creek (No. 2 Gas) Coals:

Probable Amount of Winifrede Coal.

Wyoming County Only. Districts.	Thickness of Coal Assumed in Feet	Square Miles	Acres	Cubic Feet of Coal	Short Tons of Coal
Oceana	2	7.0	4,480	390,297,600	15,611,904
Clear Fork.....	2	2.0	1,280	111,513,600	4,460,544
Totals		9.0	5,760	501,811,200	20,072,448

THE CHILTON COAL.

The Chilton Coal, described briefly in Chapter V, page 142, is confined to a slightly larger portion of Oceana and Clear Fork Districts, Wyoming County, and at a somewhat lower elevation in Buffalo, Guyandot and Huff Mountains, than the bed last discussed. Like the Winifrede Coal, not a single exposure either at crop or in prospect opening was observed for this seam, due to the same conditions prevailing. However, it is present in good thickness in the immediately adjoining portion of Triadelphia District, Logan County, as determined by Hennen and Reger; thus making the assumption reasonable that it persists with the same dimensions in the adjoining portions of the Districts in question.

Quantity of Chilton Coal Available.

The approximate minable area of the Chilton Coal along with that for the No. 5 Pocahontas bed is exhibited on Figure 9. The following estimate, based solely on the evidence given in the Report last cited, is made for the probable amount of this seam. As its outcrop is not given on Map II, the acreage

^aRay V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 409-465; 1914.

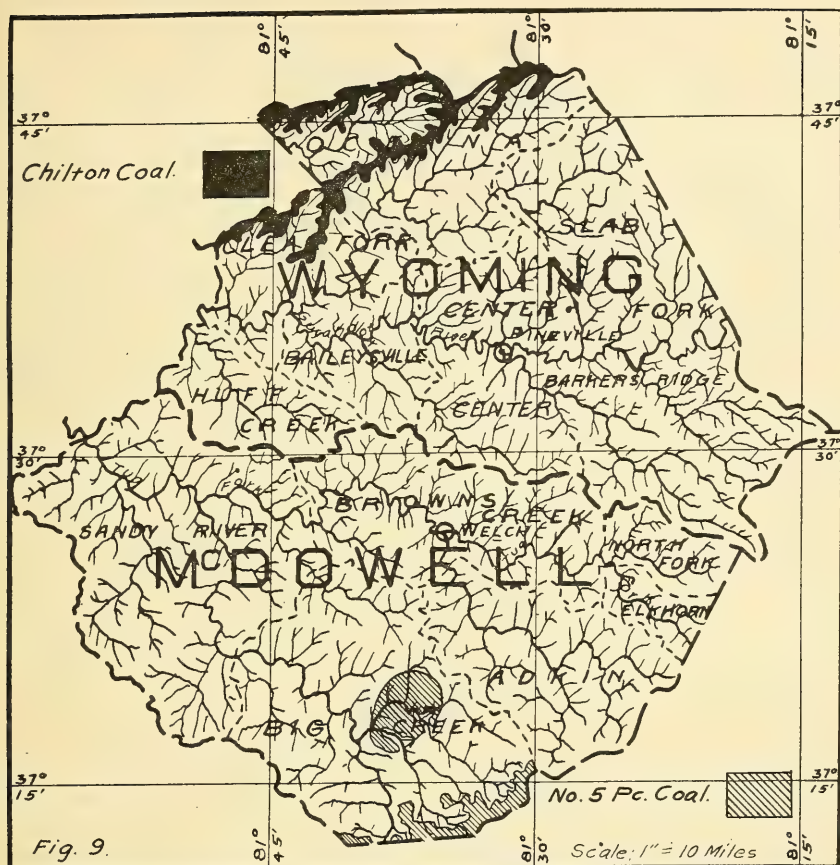


Figure 9.—Showing Approximate Movable Areas of the Chilton and No. 5 Pocahontas Coals (See explanations in Author's Preface).

is interpolated by Gawthrop from the crops of the No. 5 Block and Campbell Creek (No. 2 Gas) Coals:

Probable Amount of Chilton Coal.

Wyoming County Only. Districts.	Thickness of Coal Assumed in Feet	Square Miles	Acres	Cubic Feet of Coal	Short Tons of Coal
Oceana	4	12.0	7,680	1,338,163,200	53,526,528
Clear Fork.....	4	5.0	3,200	557,568,000	22,302,720
Totals		17.0	10,880	1,895,731,200	75,829,248

THE WILLIAMSON COAL.

The Williamson Coal, described briefly in Chapter V, page 144, is confined to a still larger portion of Oceana and Clear Fork Districts, Wyoming County, and at a somewhat lower elevation in Buffalo, Guyandot and Huff Mountains, than the bed last discussed. For the same reason as mentioned under the account of the Winifrede seam, crop exposures and prospect openings on it are lacking, as only one was observed, but it is believed that this coal is present in minable thickness and purity over practically the same area—slightly enlarged—as that outlined on Figure 9 for the Chilton bed, since Hennen⁷ and Reger so determine it in the immediately adjoining portions of Triadelphia District, Logan, and Stafford District, Mingo County. The following is the exposure mentioned above, the same being in the northwest edge of Oceana District:

Coal Opening—No. 172 on Map II.

On Toney Fork, 3.5 miles northeast of Campus; **Williamson Coal**; elevation, 1770' B.

		Ft.	In.
Sandstone, flaggy.....			
Coal, gas, soft.....	1' 4"		
Coal, gas, harder.....	1 8	3	0

Quantity of Williamson Coal Available.

As mentioned above, the approximate minable area of the Williamson Coal is confined to the region, slightly extended, that is outlined on Figure 9 for the Chilton bed. Based on the foregoing data, the following estimate is made for this seam. As its outcrop is not given on Map II, the acreage is interpolated by Gawthrop from the crops of the No. 5 Block and Campbell Creek (No. 2 Gas) Coals:

⁷Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. Geol. Survey, pp. 486-511; 1914.

Probable Amount of Williamson Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres	Cubic Feet of Coal	Short Tons of Coal
Oceana	2	17.0	16,880	947,865,600	37,914,624
Clear Fork.....	2.5	6.0	3,840	418,176,000	16,727,040
Totals		23.0	20,720	1,366,041,600	54,641,664
McDowell					
Sandy River....	2.5	0.3	192	20,908,800	836,352
Totals for Both Counties..		23.3	20,912	1,386,950,400	55,478,016

THE CEDAR GROVE ("UPPER THACKER") COAL.

The Cedar Grove Coal, which has been described briefly in Chapter V, pages 145-6, is a very important bed, especially in the northwest portions of Oceana and Clear Fork Districts, Wyoming County. In the immediately adjoining Counties of Logan and Mingo, it has been mined quite extensively, where it yields a fine grade of steam and domestic fuel. There it is known locally as the "Island Creek" and "Thacker," respectively. Its approximate minable area is shown on Figure 10.

Oceana District, Wyoming County.

In Oceana District, the Cedar Grove Coal is probably of minable dimensions over all the area indicated on Figure 10. Only three openings were observed on it, and all are in this District. A sample for analysis was collected and the following data obtained by Hennen at a country bank in this bed:

Floyd Cook Coal Opening—No. 1 on Map II.

On west edge of hill road on head of Lower Road Branch, 2.1 miles northwest of Oceana; Cedar Grove Coal; elevation, 1845' B.

	Ft.	In.
1. Concealed		
2. Shale, sandy, buff.....	15	0
3. Coal, gas, hard.....0' 5"		
4. Coal, gas, medium hard...4 0	4	5
5. Slate		



Figure 10.—Showing Approximate Minal Area of Cedar Grove ("Upper Thacker") Coal (See explanations in Author's Preface).

The composition of the sample from Nos. 3 and 4 of section is given under No. 1 in the table at the end of this Chapter.

Coal Prospect No. 173 on the Cedar Grove Coal is located one-half mile northeastward from that last described, on the northwest hillside of Oldhouse Branch, at an elevation of 1845' *P.*, as determined by the writer. The opening had fallen shut, but the bed is reported 3 feet in thickness.

An opening on the opposite side of Huff Mountain shows the following as reported by Gawthrop:

Coal Opening—No. 174 on Map II.

On head of Big Branch of Huff Creek, 1.6 miles south of Swope;
Cedar Grove Coal; elevation, 1790' B.

		Ft.	In.
Shale, dark, gray, silicious.....		10	0
Coal, semi-splint.....	1' 2"		
Coal, gas, hard.....	1 6		
Coal, semi-splint.....	1 6		
Cannel coal reported, concealed by water.....	2 0	6	2

Clear Fork and Huff Creek Districts, Wyoming County.

In Clear Fork District, the only exposure of the Cedar Grove Coal observed was **No. 175 on Map II**, located 5½ miles southwest of Oceana and 2½ miles northwest of Elklick on the head of Cedar Creek, the thickness of which is exhibited in the section of the latter stream, page 65.

In Huff Creek District, it is confined to a small acreage in the extreme western point near the summit of a high knob, where it should be in minable thickness, judged from its dimensions—9 feet 1 inch—2½ miles westward, as shown on page 568 of the Logan-Mingo County Report.

Sandy River District, McDowell County.

In Sandy River District, this bed is confined to the south side of the same knob as that last mentioned and to the extreme western point on the State Line between West Virginia and Virginia. The following data were furnished the writer by C. A. Davidson, Assistant Geologist of the Virginia Geological Survey, from a prospect opening on this bed, located on the head of Bull Creek in the extreme western edge of the District, 3 miles westward from the mouth of Road Fork:

Prospect Opening—No. 176 on Map II.

On the head of Bull Creek, 3 miles westward from the mouth of Road Fork, in the extreme western edge of Sandy River District; Cedar Grove ("Upper Thacker") Coal; elevation, 2005' B.

			Ft.	In.
Shale, light gray, and sandy.....				
Coal	0'	3½"		
Bone	0	1		
Coal, medium hard.....	3	2¾		
Bone	0	0½		
Coal, medium hard.....	3	6¼		
Shale, bluish.....	0	3		
Coal	4	8		
Shale, carbonaceous.....	0	4		
Coal	0	8		
Shale, gray, with plant fossil stems	1	4½		
Coal	2	5½	16	11
Slate				

The above is the maximum thickness ever reported for the Cedar Grove ("Upper Thacker") Coal in the State. Plate XXIII, taken at this opening, was kindly furnished the Survey by Henry Hinds, Geologist for the U. S. Geological Survey.

Quantity of Cedar Grove Coal Available.

Based on the evidence at the openings given above and its thickness in the immediately adjoining portions of Logan and Mingo Counties, and a determination of the areas outlined on Figure 10 by interpolation between that of the Williamson and Campbell Creek (No. 2 Gas) beds by Gawthrop, the following estimate is made for the Cedar Grove ("Upper Thacker") Coal, none having yet been mined out in either county:

Probable Amount of Cedar Grove Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres	Cubic Feet of Coal	Short Tons of Coal
Wyoming:					
Oceana	4	20.0	12,800	2,230,272,000	89,210,880
Clear Fork.....	4	7.0	4,480	780,595,200	31,223,808
Huff Creek.....	5	0.1	64	13,939,200	557,568
Totals		27.1	17,344	3,024,806,400	120,992,256
McDowell:					
Sandy River....	6	0.5	320	83,635,200	3,345,408
Totals for Both Counties..		27.6	17,664	3,108,441,600	124,337,664

THE LOWER CEDAR GROVE ("LOWER THACKER") COAL.

The Lower Cedar Grove Coal, described briefly in Chapter V, pages 146-7, is a very important bed, especially in Oceana and Clear Fork Districts (Wyoming), where it has been mined for local domestic fuel in the former area. In the immediately adjoining County of Mingo on the west, it has been mined quite extensively on Alum Creek, where it is known as the "Lower Thacker" seam and yields a fine grade of steam and domestic fuel. Its approximate minable area is shown on Figure 11. Its outcrop is not given on Map II, but this may be readily determined in the region of its occurrence, as it belongs 1650 to 1700 feet above the horizon of the Sewell Coal, the elevation of which is shown by the green structure contours on the map last mentioned.

Oceana District, Wyoming County.

In Oceana District, the Lower Cedar Grove Coal has been mined considerably by natives for local domestic fuel. The following opening on this seam was examined by Hennen:

Coal Opening—No. 177 on Map II.

On head of Oldhouse Branch of Lower Road Branch, 2 miles northwest of Oceana; **Lower Cedar Grove Coal**; elevation, 1815' B.

	Ft.	In.
Sandstone	5	0
Shale, dark, flaggy, with iron ore nodules.....	7	0
Coal streak.....	0	0½
Shale, dark, streaks of coal...0' 8"		
Coal, gas, medium hard.....4	0	
Coal, concealed, reported.....2	0	8



Figure 11.—Showing Approximate Minalable Area of Lower Cedar Grove ("Lower Thacker") Coal (See explanations in Author's Preface).

Another opening in this bed in Occana District shows the following, according to Gawthrop:

Cora Brown Coal Opening—No. 178 on Map II.

On head of Road Fork, 2 miles northwest of Oceana and 0.3 mile northeast of "Upper Gap"; Lower Cedar Grove Coal; elevation, 1840' B.

		Ft.	In.
Shale, dark, silicious.....		10	0
Shale, with iron ore nodules and coal streaks....		2	0
Coal, gas, hard.....	1' 10"		
Coal, gas, softer.....	1 2		
Coal, gas, hard.....	1 8		
Coal, gas, softer (shale floor) .1	0	5	8

Another opening in the same bed, 0.4 mile due southward, examined by Gawthrop, shows the following:

Coal Opening—No. 179 on Map II.

On east hillside of Upper Road Branch; 0.2 mile southeast of "Upper Gap" and 1.6 miles northwest of Oceana; **Lower Cedar Grove Coal**; elevation, 1870' B.

		Ft.	In.
Shale, dark, gray, silicious.....		10	0
Shale, with coal streaks.....		1	6
Coal, gas, hard.....	0' 10"		
Coal, gas, softer.....	2 0		
Coal, gas, harder.....	1 2		
Coal, gas, softer.....	1 0	5	0
Shale and concealed.....		5	0
Sandstone, massive.....		10	0

At another opening on this bed in the same District, Gawthrop collected a sample for analysis and reported the following:

L. B. Cook Coal Opening—No. 2 on Map II.

On the west hillside of Upper Road Branch, 1.5 miles northwest of Oceana, and 0.4 mile south of "Upper Gap"; **Lower Cedar Grove Coal**; elevation, 1845' B.

		Ft.	In.
Shale			
Coal, gas, hard.....	0' 10"		
Coal, gas, softer.....	1 10		
Coal, gas, hard.....	1 0		
Coal, gas, softer.....	1 2	4	10
Shale and concealed.....		5	0
Sandstone, massive, Lower Cedar Grove		20	0

The composition of the sample from the entire section of the bed is given on subsequent pages under No. 2 in the table of analyses at the end of Chapter X.

Gawthrop collected a sample for analysis and reported the following at an opening in this bed in the northern edge of Oceana District:

Pocahontas Coal & Coke Co. Opening—No. 3 on Map II.

On the north hillside of Brushy Fork of Huff Creek, $1\frac{1}{4}$ miles eastward from the mouth of the former; **Lower Cedar Grove Coal**; elevation, 2035' B.

		Ft.	In.
1. Sandstone, massive, Middle Cedar Grove		5	0
2. Coal , gas.....	0' 2"		
3. Fire clay shale.....	0 10		
4. Coal , gas, hard.....	0 10		
5. Coal , gray, softer.....	0 2		
6. Coal , semi-splint.....	2 3		
7. Coal , gas, hard.....	0 6	4	9
8. Slate, black.....			

The composition of the sample from Nos. 4, 5, 6 and 7 of the above section is given on subsequent pages under **No. 3** in the table of analyses at the end of Chapter X.

Clear Fork and Huff Creek Districts, Wyoming County.

In the northeastern edge of Clear Fork District, the thickness of the Lower Cedar Grove Coal is exhibited in the special section of the Kanawha Group given on pages 133-4 for Reedy Branch. This, in addition to the fact that it is a minable seam in the immediately adjoining portions of Logan and Mingo Counties, is evidence of its occurrence in good thickness over that portion of the District outlined for it on Figure 11.

In Huff Creek District, its area is confined to two small patches in the extreme southwestern edge, as shown on Figure 11. No exposures or prospect openings were observed on this bed within the latter area, but that it occurs in good thickness is evidenced by its dimensions—5 feet—at an opening 3 to 4 miles westward in Mingo County, as shown on page 586 of the Logan-Mingo County Report.

Sandy River District, McDowell County.

In Sandy River District, the Cedar Grove Coal is limited to three small patches as exhibited on Figure 11; viz, two in the northern point and one in the western point, the whole slightly less than one square mile in extent. In these locali-



PLATE XVIII—Showing junction line—at black arrow—of
Pocahontas Group and Mauch Chunk Series at south portal of
N. & W. R. R. Tunnel, at Hartwell, McDowell County;
shale sample 121G (see Chapter XI), taken just
above portal.

Photo by A. T. Bragonier.

ties it is believed to have practically the same thickness and character as mentioned above for Huff Creek District. No prospect openings or crop exposures were observed on it within the District under discussion.

***Quantity of Lower Cedar Grove ("Lower Thacker")
Coal Available.***

The following estimate is made for the Lower Cedar Grove Coal, based on the evidence given above and its character in the immediately adjoining portions of Logan and Mingo Counties, and a determination of the area as outlined on Figure 11 by interpolation between that of the Cedar Grove and Campbell Creek beds by Gawthrop, none having yet been mined:

Probable Amount of Lower Cedar Grove Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana	3	25.0	16,000	2,090,880,000	83,635,200
Clear Fork	3	8.0	5,120	669,081,600	26,763,264
Huff Creek	3	0.1	64	8,363,520	334,541
Totals		33.1	21,184	2,768,325,120	110,733,005
McDowell:					
Sandy River....	4	0.8	512	89,210,880	3,568,435
Totals for Both Counties..		33.9	21,696	2,857,536,000	114,301,440

THE ALMA COAL.

The Alma Coal, described in Chapter V, page 147, attains a good thickness, and its approximate minable area, shown on Figure 12, is confined to Oceana, Clear Fork and Huff Creek Districts, Wyoming County, and Sandy River District, McDowell. Its outcrop may be readily determined in the region of its occurrence, as it belongs 1550 to 1600 feet above the

horizon of the Sewell Coal, the elevation of which is given on Map II by the green structure contours.

Oceana District, Wyoming County.

Oceana District contains more acreage of the Alma Coal than all the others in each County combined, as a glance at Figure 12 will readily show. The following opening in the northern edge of the District was examined by Hennen:

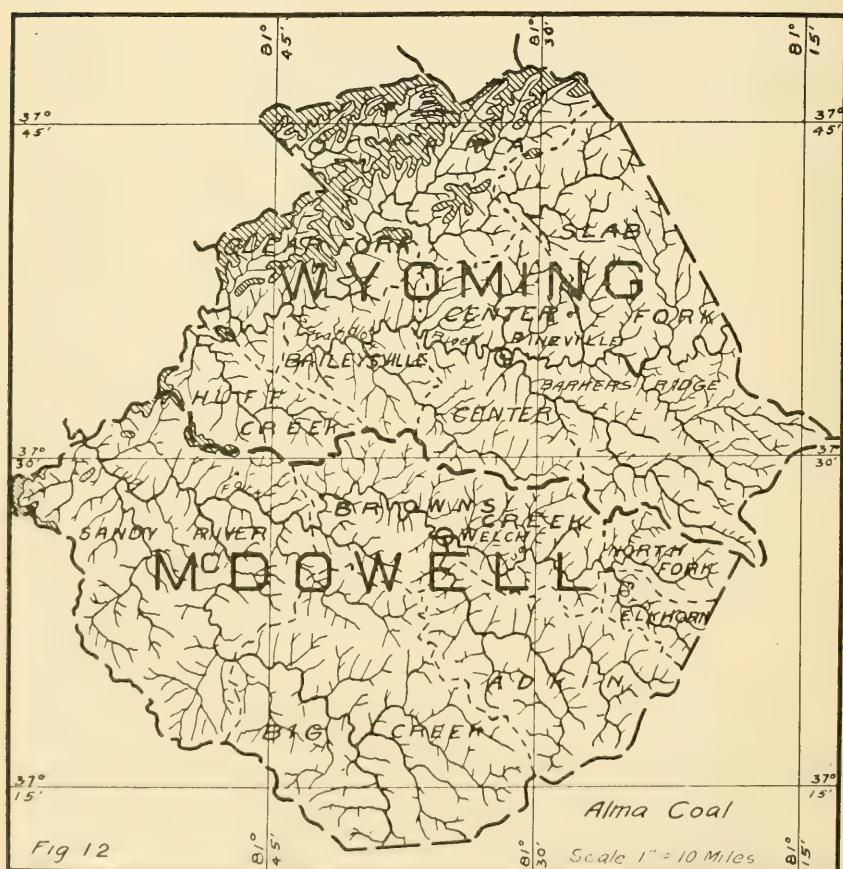


Figure 12. -Showing Approximate Movable Area of Alma Coal (See explanations in Author's Preface).

Coal Opening—No. 180 on Map II.

On north bank of Laurel Branch, $1\frac{1}{4}$ miles southwest of the common corner of Wyoming, Logan and Boone Counties; **Alma Coal**; elevation, 1755' B.

	Ft.	In.
Sandstone, massive, medium grained, light gray, Lower Cedar Grove	20	0
Shale, black, sandy.....	30	0
Coal, cannel, Alma	2	4
Shale, black, sandy.....	4	0
Concealed	5	0
Sandstone, massive, Monitor ("Logan")	50	0
Coal, Little Alma	1	6

The following opening was examined by Gawthrop:

Coal Opening—No. 181 on Map II.

On head of Dingess Fork of Huff Creek, 2.4 miles northeast of Oceana and 0.5 mile north of Panther Knob; **Alma Coal**; elevation, 1975' B.

	Ft.	In.
Sandstone, flaggy.....	5	0
Coal, gas.....1' 6 "		
Shale	0	3½
Coal, gas.....0 1½		
Shale, gray.....0 1		
Coal, gas.....0 1		
Shale, gray.....0 1		
Coal, gas.....2 0	4	2
Shale and concealed.....	5	0
Sandstone, massive.....	10	0

On the opposite side of Huff Mountain in the same District, the writer examined **Coal Opening No. 182 on Map II** in this bed, near the head of Cow Creek, at an elevation of 2040' B., $1\frac{3}{4}$ miles northeast of Oceana. The opening had fallen shut, but the coal is reported to have a thickness of 4 feet.

Clear Fork and Huff Creek Districts, Wyoming County.

In Clear Fork District, the Alma Coal is probably thicker than in that last described, but is much split up with fire clay and slate partings. The following opening in the northern edge of the District was examined by Gawthrop:

Coal Opening—No. 183 on Map II.

On north hillside of Upper Sturgeon Branch of Cub Creek, 1.2 miles southwest of Burning Rock Knob; **Alma Coal**; elevation, 1720' B

		Ft.	In.
Sandstone, massive.....		3	0
Shale, gray.....		2	0
Coal, gas.....	1' 0"		
Coal, blocky, hard.....	1 10		
Coal	1 0		
Bone	0 2		
Coal	0 2		
Fire clay.....	1 0		
Coal, reported.....	4 0	9	2
Concealed		15	0
Sandstone, massive, Monitor ("Logan")		50	0

In Huff Creek District, the Alma Coal was not observed at either prospect openings or crop exposures, but it is believed to be present with the same thickness and character as in that last described, and as given in the immediately adjoining portion of Mingo in the Logan-Mingo Report.

Sandy River District, McDowell County.

In Sandy River District, the Alma Coal is confined to five scattered patches along the north and western borders, where it is probably thicker than in Wyoming County. The following prospects in this bed, on the west edge of the District, were examined by Hennen:

Coal Prospect—No. 184 on Map II.

On the head of Bull Creek, 3.1 miles westward from the mouth of Road Fork; **Alma Coal**; elevation, 1775' B.

			Ft.	In.
Concealed			4	0
Sandstone				
Coal, slaty.....	0' 1½"	Upper Bench	3'	8"
Slate, black.....	0 1½			
Coal, gas.....	0 10			
Shale, gray.....	0 11			
Coal, splinty.....	1 8	Lower Bench	11	8
Shale and concealed and shale.....	8 0			
Coal, gas.....	0' 10 "			
Shale, buff, sandy.....	7 0			
Coal, gas, medium hard...	3 10			
Slate				

No sample was obtained for the Alma Coal in the territory of this Report, but it is of practically the same composition and character as described for it in the immediately adjoining Counties on the west in the Logan-Mingo Report of the State Geological Survey.

Quantity of Alma Coal Available.

The following estimate is made for the Alma Coal, based on the evidence given in the foregoing pages and on a determination of the area as outlined on Figure 12 by interpolation between that for the Lower Cedar Grove and Campbell Creek (No. 2 Gas) beds, none having yet been mined:

Probable Amount of Alma Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres	Cubic Feet of Coal	Short Tons of Coal
Wyoming:					
Oceana	2	30.0	19,200	1,672,704,000	66,908,160
Clear Fork.....	2.5	9.0	5,760	627,264,000	25,090,560
Huff Creek.....	3	0.2	128	16,727,040	669,081
Totals		39.2	25,088	2,316,695,040	92,667,801
McDowell:					
Sandy River....	3	1.2	768	100,362,240	4,014,489
Totals for Both Counties..		40.4	25,856	2,417,057,280	96,682,290

THE CAMPBELL CREEK ("NO. 2 GAS") COAL.

The Campbell Creek or "No. 2 Gas" Coal, described in Chapter V, page 150, is confined to practically the same portions of Wyoming and McDowell as the bed last described. Its outcrop is outlined in detail on Map II; and its approximate minable area, on Figure 13. There is evidence to support the belief that it is of minable dimensions throughout all the localities shown on this figure, both from prospect openings and crop exposures within the territory of this Report and in the immediately adjoining Counties on the west and north as shown in the Logan-Mingo and Boone County Reports, re-

spectively, of the State Geological Survey, to which reference is made for its chemical composition and calorific value.

Oceana District, Wyoming County.

Oceana District contains slightly over two-thirds of the total acreage of the Campbell Creek ("No. 2 Gas") Coal of both Counties. The thickness of the bed is exhibited in the special sections of the Kanawha Group in Chapter V for Crany, Pilot Knob and Toney Fork. On the waters of Huff Creek in the northwestern edge of the District, Gawthrop obtained the following at an opening in this bed:



Figure 13.—Showing Approximate Movable Area of Campbell Creek ("No. 2 Gas") Coal (See explanations in Author's Preface).

Coal Opening—No. 185 on Map II.

On the east bank of Toney Fork, 2.7 miles northeast of Campus;
Campbell Creek ("No. 2 Gas") Coal; elevation, 1425' B.

			Ft.	In.
Shale, dark gray.....				
Coal, slaty	0'	6"		
Coal, good.....	2	0	2	6

The total bed section was probably not exposed at this opening.

Slightly over 3 miles eastward in the same District, Gawthrop obtained the following at an opening in this seam:

Coal Opening—No. 186 on Map II.

On the west bank of Coal Branch of Huff Creek, $\frac{1}{2}$ mile northwest of the mouth of the former; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 1640' B.

			Ft.	In.
Sandstone, massive.....			5	0
Shale, gray.....			2	6
Coal, slaty.....	0'	2"		
Shale, gray.....	0	10		
Coal, gas.....	0	8		
Shale, gray.....	0	7		
Coal, gas.....	1	7		
Shale, dark gray.....	2	2		
Coal, slaty.....	0	4		
Coal, gas.....	1	2		
Slate, black.....	0	0 $\frac{1}{2}$		
Coal, gas, hard.....	0	7 $\frac{1}{2}$		
Coal, gas, columnar (shale floor)	0	8	8	10

Slightly over a mile northeastward the writer obtained the following at an opening in this coal:

Coal Opening—No. 187 on Map II.

Three-tenths mile up Laurel Branch of Huff Creek, on the east bank; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 1675' B.

			Ft.	In.
Concealed				
Shale, dark, sandy, with fossil plants.....			5	0
Coal	0'	1"		
Slate, black	0	1		
Coal, gas	0	0 $\frac{1}{2}$		

			Ft.	In.
Shale, dark gray.....	0'	7"		
Coal	0	1		
Fire clay shale.....	3	10		
Coal, gas, medium hard.....	2	8	7	4½
<hr/>				
Shale and concealed.....			7	0
Sandstone, massive				

The four following openings in the Campbell Creek ("No. 2 Gas") Coal, all in the same region, and on the waters of Huff Creek in Oceana District, were examined by Gawthrop:

Coal Prospect—No. 188 on Map II.

On the south hillside of Straight Fork of Huff, 0.8 mile east of mouth of Trace Fork; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 1840' B.

			Ft.	In.
Concealed				
Shale, gray.....			10	0
Coal, gas.....	1'	3"		
Shale, gray.....	0	7		
Coal	0	1		
Shale, gray.....	0	1		
Coal	0	1		
Coal, gas, medium hard.....	1	7		
Shale and concealed.....	8	0		
Shale, gray.....	2	0		
Coal, gas, hard	0	10		
Shale, gray.....	5	0		
Coal, gas.....	1	6	21	0

Coal Prospect—No. 189 on Map II.

On west hillside of Longlick Branch, 2.7 miles northward from Oceana; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 1745' B.

			Ft.	In.
Shale				
Coal, gas.....	1'	0"		
Shale	0	2		
Coal, gas, good.....	0	10		
Shale, gray.....	5	5		
Coal, gas, medium hard.....	1	8		
Shale, reported.....	0	1		
Coal, concealed, reported (shale floor)	1	8	10	10

Coal Opening—No. 190 on Map II.

One-half mile southeast of No. 189, on head of Longlick Branch;
Campbell Creek ("No. 2 Gas") Coal; elevation, 1760' B.

		Ft.	In.
Shale			
Coal, gas, columnar.....	1' 2"		
Shale	0 2½		
Coal, gas, columnar.....	0 9		
Shale, dark gray.....	0 7		
Coal, gas, columnar.....	2 1		
Shale	0 0½		
Coal, gas, harder.....	1 9	6	7
<hr/>			
Shale and concealed.....		5	0
Sandstone, massive.....			

Coal Opening—No. 191 on Map II.

On head of Trace Fork, 1.3 miles northward from summit of
 Panther Knob and 1 mile southeast of mouth of Trace; **Campbell Creek**
 ("No. 2 Gas") **Coal**; elevation, 1860' B.

		Ft.	In.
Shale, dark, silicious.....		10	0
Coal, gas.....	0' 7"		
Coal, gas, hard.....	1 10		
Coal, gas, softer (slate, black, floor)	0 8	3	1

In the northeastern portion of Oceana District, the thickness and bed structure of the Campbell Creek ("No. 2 Gas") Coal at **Openings No. 193 and 194**, on the heads of Crane and Toney Forks, are given in the special sections of the Kanawha Group in Chapter V, for Pilot Knob—¾ mile Southeast, and Toney Fork, pages 129 and 130, respectively.

The following is a section as reported by Capt. M. A. Miller and published by I. C. White on page 580 of Volume II of the State Survey Reports:

Coal Opening—No. 192 on Map II.

On southeast hillside of Crane Fork of Clear Fork, 1 mile northeast of the mouth of the former; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 2385' B.

		Ft.	In.
Coal	2' 8"		
Slate	2 0		
Coal	3 7		

			Ft.	In.
Slate	1'	4"		
Coal	0	9		
Slate	2	0		
Coal	0	8	13	0

Clear Fork District, Wyoming County.

In Clear Fork District, the Campbell Creek ("No. 2 Gas") Coal is well developed and has been prospected and mined for local domestic fuel consumption by natives. The two following openings were examined by Gawthrop in the northern point of the District:

Cole and Crane Coal Opening—No. 195 on Map II.

On head of Cub Creek, 0.8 mile northward from mouth of Upper Sturgeon; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 1585' B.

			Ft.	In.
Concealed				
Shale, dark bluish gray, silicious.....			6	0
Coal, slaty	0'	3"		
Coal, gas, medium hard.....	2	0		
Shale, gray.....	0	2		
Coal, gas.....	0	2½		
Shale, gray.....	0	3½		
Coal, gas, hard.....	0	10	Upper Bench	3 9
Shale and concealed.....			7	0
Shale, gray, silicious.....			3	0
Coal, splint.....	0'	6"		
Coal, semi-splint.....	1	0		
Coal, gas, hard.....	1	2	Lower Bench	2 8
Shale and concealed.....			10	0
Sandstone, flaggy.....			7	0

Cole and Crane Coal Opening—No. 196 on Map II.

On opposite side of Cub Creek, 0.15 mile southwest of Opening No. 195; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 1580' B.

	Ft.	In.
Sandstone, visible	2	0
Coal, gas, hard.....	2	6
Shale and concealed.....		

Only the lower bench of this bed has evidently been opened here.

Three miles southward the following opening was examined by Gawthrop:

Coal Opening—No. 197 on Map II.

On head of Reedy Branch of Guyandot River, on east hillside, 1.4 miles northward from Uno P. O.; **Campbell Creek ("No. 2 Gas") Coal**; elevation, 1860' B.

	Ft.	In.
Concealed		
Coal, visible	1	10
Concealed		

The opening had so fallen shut that it was not possible to get its full bed section, but the following was given for it at this mine by Connie Walls:

		Ft.	In.
Coal	5'	0"	
Shale	2	0	
Coal	4	0	
		11	0

Slab Fork, Center, Baileysville and Huff Creek Districts, Wyoming County.

In Slab Fork District, the Campbell Creek ("No. 2 Gas") Coal is confined to a few acres in its northwest edge near the summit of the dividing ridge between Clear and Laurel Forks, 2½ miles northwest of McGraw, where it should have practically the same thickness and character as at Opening No. 192 on Map II, described above.

In Center District, it is confined to a few acres on the "Chestnut Flats," 5 miles northeast of Baileysville, in its northwest corner, where it probably has the same thickness as in the openings listed above for Clear Fork District.

In Baileysville District, this coal is confined to a few acres in the same region as that last mentioned and to a small area 4½ miles southwest of Baileysville at the common corner of Baileysville, Clear Fork and Huff Creek Districts. In these localities it has probably the same thickness and character as in other openings listed above for Wyoming County.

In Huff Creek District, this bed is confined mostly to near the summit of the high dividing ridge forming the boundary

between Wyoming and McDowell Counties. No prospect openings or crop exposures were observed on its borders or those of Slab Fork, Center and Baileysville, but the Campbell Creek ("No. 2 Gas") Coal probably has the same thickness and character as described in the immediately adjoining portion of Mingo County by Hennen and Reger in the Logan-Mingo Report of the State Geological Survey, pages 665-9.

Sandy River District, McDowell County.

In Sandy River District, the Campbell Creek ("No. 2 Gas") Coal is confined to several scattered patches in the northwestern half of the District, as shown by Figure 13. No prospect openings or crop exposures were observed on this bed within the District, but it is probably of the same thickness and character as mentioned in the districts last described, or the adjoining portion of Mingo County.

Quantity of Campbell Creek ("No. 2 Gas") Coal Available.

The following estimate is made for the Campbell Creek ("No. 2 Gas") Coal, based on the evidence of the preceding pages and a planimetric determination of its area from Map II and as exhibited in Figure 13:

Probable Amount of Campbell Creek Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana	4	43.30	27,712	4,828,538,880	193,141,555
Clear Fork	4	12.90	8,256	1,438,525,440	57,541,017
Baileysville	4	.06	38	6,690,816	267,632
Huff Creek	4	.62	397	69,138,432	2,765,536
Slab Fork	5	.05	32	6,969,600	278,784
Center	5	.02	13	2,787,840	111,513
Totals		56.95	36,448	6,352,651,008	254,106,037
McDowell:					
Sandy River	4	2.40	1,536	267,632,640	10,705,305
Totals for Both Counties...		59.35	37,984	6,620,283,648	264,811,342

THE POWELLTON (BROWNSTOWN) COAL.

The **Powellton Coal**, described in Chapter V, page 151, is of secondary importance when the thicker beds above and below it are considered, yet it is believed that this bed contains a large amount of available fuel that will become valuable when the others begin to approach exhaustion. As shown on Figure 14, it is confined to practically the same regions as outlined for the seam last described. Since it belongs only 60 to 100 feet below the latter coal, its outcrop may be readily determined in the region of its occurrence, as that for the Campbell Creek ("No. 2 Gas") Coal is given in detail on Map II.

Oceana District, Wyoming County.

In Oceana District, the Powellton Coal probably attains its best development in the two Counties, especially on Toney Fork of Clear Fork. In the northern edge of the District on the waters of Huff Creek, the writer obtained the following section:

Coal Prospect—No. 198 on Map II.

One-fourth mile up Laurel Branch of Huff Creek, on east bank and 3.6 miles northeast of Swope; **Powellton Coal**; elevation, 1645' B.

	Ft.	In.
Campbell Creek ("No. 2 Gas") Coal at opening No.		
187 on Map II.....	7	4½
Slate and concealed.....	7	0
Sandstone, massive, and concealed.....	20	0
Sandstone, Brownstown , massive, light gray.....	20	0
Coal, gas .....0' 8½"		
Shale, gray.....3 6		
Coal, visible.....1 3 Powellton ..	5	5½
Concealed		

Its total bed section was not obtained at the above prospect, and the same is true at the following prospect examined by Gawthrop:



Figure 14.—Showing Approximate Movable Area of the Powellton (Brownstown) Coal (See explanations in Author's Preface).

Coal Prospect—No. 199 on Map II.

On south hillside of Straight Fork of Huff Creek, $\frac{3}{4}$ mile east of mouth of Trace Fork; Powellton Coal; elevation, 1760' B.

	Ft.	In.
Coal, Campbell Creek ("No. 2 Gas"), at Prospect		
No. 188 on Map II.....	21	0
Shale and concealed.....	72	0
Slate, black, with fossil plants.....	2	0
Coal, gas, Powellton.....	1	2
Concealed		

The thickness and bed section of the Powellton Coal at **Prospect No. 200 on Map II**, located on south bank of Toney Fork, 2.3 miles southwest of the summit of Pilot Knob, are given in the Toney Fork Section in Chapter V, page 130, this being the thickest exposure observed in either County.

Clear Fork District, Wyoming County.

In Clear Fork District, the Powellton Coal has been mined by natives for local domestic fuel to a small extent on the waters of Cub Creek and Reedy Branch, the two following sections having been obtained by Gawthrop at such exposures:

Coal Opening—No. 201 on Map II.

Six-tenths mile southeast of the mouth of McDonald Fork of Cub Creek, on east side of branch of former; **Powellton Coal**; elevation, 1600' B.

	Ft.	In.
Sandstone, flaggy and shaly.....	5	0
Coal, thickness concealed, reported.....	3	0
Shale and concealed.....		

The above opening had fallen shut so that a section could not be obtained by direct measurement.

H. W. Saunders Coal Prospect—No. 202 on Map II.

On west hillside of Reedy Branch, 1.5 miles southeast of the summit of Burning Rock Knob; **Powellton Coal**; elevation, 1755' B.

	Ft.	In.
Concealed		
Sandstone	1	0
Coal, gas	2	6
Shale and concealed.....	5	0
Sandstone, massive	3	0

Baileysville, Huff Creek, Slab Fork and Center Districts. Wyoming County.

In these four Districts of Wyoming County, no exposures either at prospects or crop were observed on the Powellton

Coal, but it is very probable that it is present in minable dimensions over the localities outlined for it on Figure 14.

Sandy River District, McDowell County.

In Sandy River District, the Powellton Coal is confined to several scattered patches in the northwest half of the District, as shown in Figure 14. Its thickness and bed section at **Prospects Nos. 203 and 204 on Map II** are given in Chapters V and IV, in the sections for Head of Longpole and Mouth of Longpole, pages 135 and 87, respectively, where it is shown to be of minable dimensions and purity.

Quantity of Powellton ("Brownstown") Coal Available.

Based on the evidence given above and a determination of the minable area of the Powellton Coal, as outlined on Figure 14, by interpolation between that for the Campbell Creek ("No. 2 Gas") and Eagle ("Middle War Eagle") beds by Gawthrop, the following estimate is made:

Probable Amount of Powellton Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana	2	50.00	32,000	2,787,840,000	111,513,600
Clear Fork.....	2	16.00	10,240	892,108,800	35,684,352
Baileysville	2	0.50	320	27,878,400	1,115,136
Huff Creek.....	2	2.00	1,280	111,513,600	4,460,544
Slab Fork.....	2	0.30	192	16,727,040	669,081
Center	2	0.03	19	1,672,704	66,908
Totals.....	.....	68.83	44,051	3,837,740,544	153,509,621
McDowell:					
Sandy River.....	2	5.00	3,200	278,784,000	11,151,360
Totals for Both Counties..		73.83	47,251	4,116,524,544	164,660,981

THE MATEWAN COAL.

The **Matewan Coal**, described briefly in Chapter V, pages 152-3, ranks in importance along with the bed last described and the same remarks as to the future value of the latter ap-

ply with equal force for this seam. Its approximate minable acreage is confined to practically the same areas as that outlined on Figure 14 for the Powellton Coal. As it belongs only 30 to 60 feet above the Eagle ("Middle War Eagle") bed, its outcrop may be readily determined in the region of its occurrence, since that for the Eagle is given in detail on Map II.

Oceana District, Wyoming County.

The Matewan Coal probably attains its best development in Oceana District. Here it has been mined and prospected to a considerable extent by natives for local domestic fuel. In the north central border of the District, the writer obtained the following at its crop in the edge of the public road:

Crop Exposure—No. 205 on Map II.

On north side of Huff Creek, just above the mouth of Laurel Branch; **Matewan Coal**; elevation, 1580' B.

	Ft.	In.
Sandstone	30	0
Shale, dark, sandy.....	6	0
Limestone, Stockton , dark gray, silicious, lenticular	1	3
Slate, black, Stockton , with marine fossils.....	15	0
Slate, black, calamite fossil plants abundant.....	2	0
Coal , gas, medium hard.....1' 2"		
Coal and slate, interlaminated	1	0
Coal , gas, medium hard.....0	4	
Shale, dark gray, sandy.....4	10	
Coal , gas, medium hard (slate floor)	2	2
	9	6

In the same region, the three following openings on the waters of Huff Creek were examined by Gawthrop:

Coal Opening—No. 206 on Map II.

One-half mile up Brushy Fork of Huff Creek, on south bank; **Matewan Coal**; elevation, 1620' B.

	Ft.	In.
Concealed		
Shale, dark gray, with plant fossils.....	5	0
Coal , gas, columnar.....0' 11"		
Shale, gray.....0	3	

			Ft.	In.
Coal	0'	1"		
Shale, gray.....	0	7		
Coal, gas, medium hard.....	1	8	3	6
<hr/>				
Shale and concealed.....			40	0
Sandstone, massive			30	0

Coal Opening—No. 207 on Map II.

On south bank of Brushy Fork, 0.6 mile eastward from Opening No. 206 on Map II; **Matewan Coal**; elevation, 1715' B.

			Ft.	In.
Concealed				
Slate, black, Stockton , with marine and plant fossils			5	0
Coal, visible.....			1	0
Concealed			15	0
Sandstone, massive			10	0

The above opening had fallen shut when visited by Gawthrop, so that a total bed section was not obtained.

Coal Exposure—No. 208 on Map II.

On north bank of Straight Fork of Huff Creek, and one mile south-east of mouth of Brushy Fork; **Matewan Coal**; elevation, 1705' B.

			Ft.	In.
Sandstone, flaggy.....			3	0
Coal, soft	2'	0"		
Shale and concealed.....	3	0		
Coal, reported	1	0		
Concealed	2	0		
Coal, reported (concealed floor) 0	10		8	10

In the extreme eastern point of Oceana District, the writer obtained the following data at an opening in this bed:

Coal Opening—No. 4 on Map II.

On the north edge of the public road leading down Clear Fork, 200 to 300 feet west of "Clear Fork Gap"; **Matewan Coal**; elevation, 2750' B.

			Ft.	In.
Sandstone, flaggy.....			30	0
Shale, Stockton , dark, sandy, with marine and plant fossils.....			15	0
Coal, soft.....	0'	5"		
Slate, black, 1/8" to.....	0	0 1/2		
Coal, soft (slate floor).....	4	1	4	6 1/2

C. E. Krebs collected a sample for analysis from both benches in the above opening, the composition of which is given under **No. 4** in the table of analyses at the end of this Chapter.

The stratigraphic position of the Matewan Coal is exhibited in the Clear Fork Gap Section, pages 63-4.

Clear Fork, Baileysville, Huff Creek, Slab Fork and Center Districts, Wyoming County.

In these five Districts of Wyoming, the Matewan Coal is probably present in minable dimensions in those localities outlined for the Powellton bed on Figure 14, but no exposures either at prospects or outcrop were observed.

Sandy River District, McDowell County.

In McDowell County, the Matewan Coal is confined to scattered patches in the northwestern half of Sandy River District, or to practically the same localities as outlined on Figure 14 for the Powellton bed. Its thickness and bed structure are given in the special sections of the Kanawha Group in Chapter V for Head of Longpole, Longpole P. O.—North, and Longpole P. O.—Northeast, at **Prospects Nos. 209, 210 and 211**, pages 135-6, 136 and 137, respectively; and in the general section for Mouth of Longpole in Chapter IV at **Prospect No. 212**.

Quantity of Matewan Coal Available.

The following estimate for the Matewan Coal has been made, based on the evidence of its thickness and persistence at the above mentioned prospects and openings, and a determination of its areal extent by interpolation between that for the Powellton and the Eagle ("Middle War Eagle") beds by Gawthrop, no coal having yet been mined from it in either County:

Probable Amount of Matewan Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana	2	53.00	33,920	2,955,110,400	118,204,416
Clear Fork.....	2	18.00	11,520	1,003,622,400	40,144,896
Baileysville	2	0.70	448	39,029,760	1,561,190
Huff Creek.....	2	2.80	1,792	156,119,040	6,244,761
Slab Fork.....	2	0.50	320	27,878,400	1,115,136
Center	2	0.04	26	2,230,272	89,210
Totals.....		75.04	48,026	4,183,990,272	167,359,609
McDowell:					
Sandy River.....	2	7.00	4,480	390,297,600	15,611,904
Totals for Both Counties..		82.04	52,506	4,574,287,872	182,971,513

THE EAGLE ("MIDDLE WAR EAGLE," "MOHAWK") COAL.

The Eagle Coal, described in Chapter V, pages 154-5, is a very important bed from an economic standpoint in each County, having been mined commercially at three different operations in McDowell, where it yields a high grade fuel for both steam and domestic purposes. The lack of transportation facilities has prevented its being mined commercially in Wyoming. As shown on Figure 15, it is confined to the northwest portion of each County. Map II exhibits its detailed outcrop.

Oceana District, Wyoming County.

Oceana District contains 60 per cent. of the acreage of the Eagle Coal for both Counties, and here, it has been mined and prospected quite extensively by natives for local domestic fuel. The following opening in the western border of the District was examined by Gawthrop:

Coal Opening—No. 213 on Map II.

On the east bank of Toney Fork of Huff Creek, 1.2 miles due north of Campus; **Eagle Coal**; elevation, 1150' B.

	Ft.	In.
Shale, with plant fossils.....		
Coal, soft, columnar (slate, dark, floor).....	2	0

In this region the above opening belongs 50-60 feet above

the Little Eagle bed. The four following openings in the Eagle Coal were examined by Hennen:

Geo. W. Cook Coal Opening—No. 214 on Map II.

On south hillside of Bans Branch, 1.7 miles due south of Oceana; Eagle Coal; elevation, 1845' B.

			Ft.	In.
Concealed				
Shale, dark, sandy and flaggy.....			4	0
Coal, soft, columnar.....	2'	2"		
Slate, dark gray, soft, 3" to .0		5		
Coal, soft, columnar (slate floor)	2	0	4	7

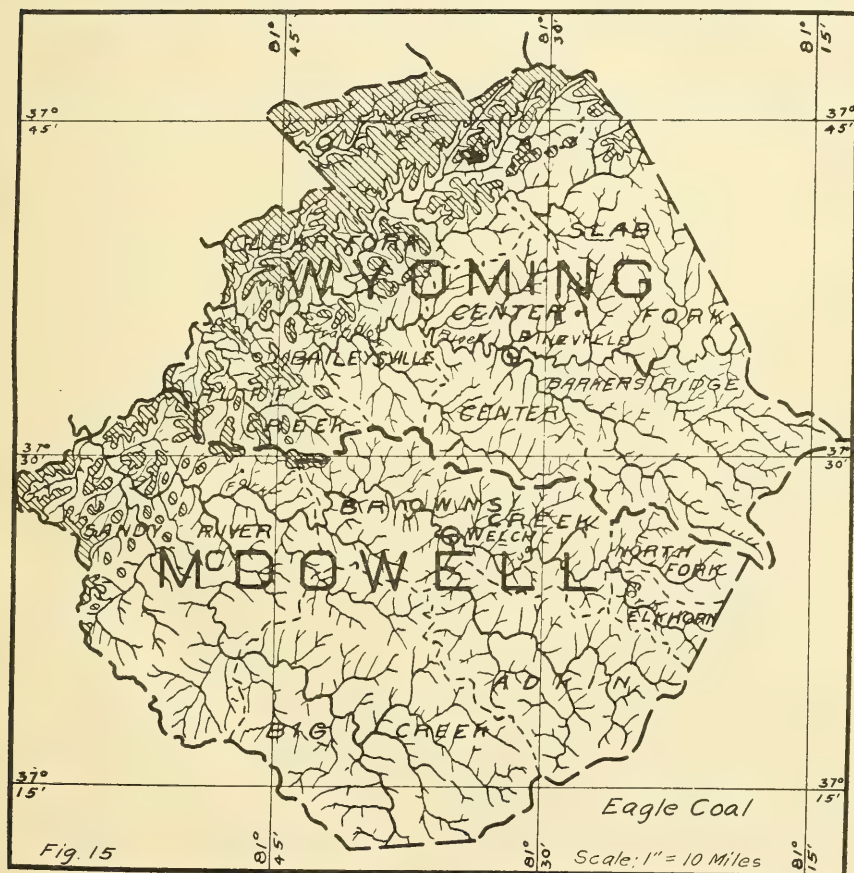


Figure 15.—Showing Approximate Movable Area of Eagle ("Middle War Eagle") Coal (See explanations in Author's Preface).

Coal Opening—No. 215 on Map II.

On the east hillside of Cow Creek, 1.3 miles northeast of Oceana and 0.5 mile north of mouth of Cow Creek; **Eagle Coal**; elevation 1800' B.

		Ft.	In.
Concealed			
Shale, bluish, sandy.....		3	0
Coal, soft, columnar, 18" to...1'	9"		
Slate, gray, 1½" to.....0	2		
Coal, soft, columnar (slate floor)	1 4	3	3

L. B. Cook Coal Opening—No. 216 on Map II.

Two miles eastward from Oceana on south hillside of Clear Fork and 0.3 mile northeast of mouth of Simmons Fork; **Eagle Coal**; elevation, 1890' B.

		Ft.	In.
Shale, dark, sandy.....			
Coal, soft, columnar.....2'	0"		
Slate, gray, 4" to.....0	5		
Coal, harder (slate floor).....1	6	3	11

Perry Bailey Coal Opening—No. 217 on Map II.

On south hillside of Clear Fork, 0.8 mile eastward from mouth of Toney Fork, and 3 miles northeast of Oceana; **Eagle Coal**; elevation, 1900' B.

		Ft.	In.
Sandstone, massive			
Concealed, mostly shale.....		60	0
Shale, dark, sandy.....		25	0
Coal, slaty.....0'	1½"		
Slate, black.....0	1½		
Coal, soft.....1	6		
Slate, black.....0	0⅜		
Coal, soft.....0	5⅞		
Slate, gray.....0	6		
Coal, soft (slate, gray, floor).1	8	4	5

Slightly less than a mile northward, Gawthrop collected a sample for analysis and measured the following section at a prospect opening in the Eagle Coal:

Pocahontas Coal & Coke Co. Prospect—No. 5 on Map II.

On west hillside of Wolfpen Branch of Clear Fork and 0.7 mile northeast of Toney Fork P. O.; **Eagle Coal**; elevation, 1850' B.

			Ft.	In.
1.	Shale, gray, silicious.....			
2.	Coal, soft, columnar.....1'	5½"		
3.	Slate, black, 1" to.....0	0½		
4.	Coal, soft, columnar.....0	4		
5.	Shale, gray.....0	3		
6.	Coal, soft, columnar (shale floor) .....1	4	3	5

The composition of the sample from Nos. 2, 4 and 6 only of section—taken 15 feet from face of drift—is given under Mine No. 5 in table of coal analyses at the end of this Chapter.

The three following openings in Oceana District were examined by Gawthrop:

Coal Opening—No. 218 on Map II.

On the east hillside of Davy Cook Branch of Toney Fork, 3 miles northeast of Oceana; **Eagle Coal**; elevation 1725' B.

			Ft.	In.
	Shale, gray, silicious.....		8	0
	Coal, soft, columnar.....1'	8½"		
	Shale .....0	0½		
	Coal, soft.....0	2½		
	Shale .....0	0½		
	Coal, soft, columnar (shale floor) .....1	4	3	4

Pocahontas Coal & Coke Co. Prospect—No. 219 on Map II.

On west hillside of Toney Fork, 0.4 mile northeast of Mine 218 on Map II, and 1.2 miles northward from Toney Fork P. O.; **Eagle Coal**; elevation, 1780' B.

			Ft.	In.
	Shale .....2'	0"		
	Coal, soft.....0	2		
	Shale .....0			
	Coal, soft (shale floor).....1	10	4	0

Coal Opening—No. 220 on Map II.

On the head of Cherry Branch of Toney Fork, 2.1 miles westward from Crany P. O.; **Eagle Coal**; elevation, 1820' B.

			Ft.	In.
Shale, dark.....			5	0
Coal, soft columnar.....	2'	2"		
Shale, gray.....	0	1½		
Coal, soft, columnar (shale floor)	1	4	3	7½

About 2 miles eastward in the same District, the writer collected a sample for analysis and obtained the following data at a country bank in the Eagle Coal:

Pocahontas Coal & Coke Co. Coal Opening—No. 7 on Map II.

On the north hillside of Clear Fork, 0.5 mile northeast of the mouth of Crane Fork; **Eagle Coal**; elevation, 2110' B.

			Ft.	In.
1. Concealed				
2. Shale, sandy, bluish gray.....			8	0
3. Coal, soft.....	0'	3"		
4. Slate, black.....	0	1		
5. Coal and slate, mixed.....	0	5¼		
6. Coal, soft, columnar.....	2	1		
7. Slate, gray.....	0	0½		
8. Coal	0	0¼		
9. Slate, gray.....	0	1		
10. Coal, soft, columnar (slate floor)	3	2	6	2

The composition of the sample from Nos. 6 and 10 only of the above section is published under Mine No. 7 in the table of analyses at the end of this Chapter.

Slightly less than a mile northwestward in the same District, Gawthrop collected a sample for analysis and obtained the following data at an opening in this bed:

Pardee Lumber Co. Coal Opening—No. 6 on Map II.

On Stonecoal Branch of Crane Fork of Clear Fork, 1.3 miles northwest of Crany P. O.; **Eagle Coal**; elevation, 2005' B.

			Ft.	In.
1. Shale, gray, silicious.....			8	0
2. Coal, soft, with streaks of slate	0'	10"		
3. Coal, soft, columnar.....	1	7		
4. Shale, gray, 7" to.....	0	3		
5. Coal, soft, columnar.....	2	5		
6. Shale	0	2		
7. Coal, soft (shale floor)...	0	5	5	8

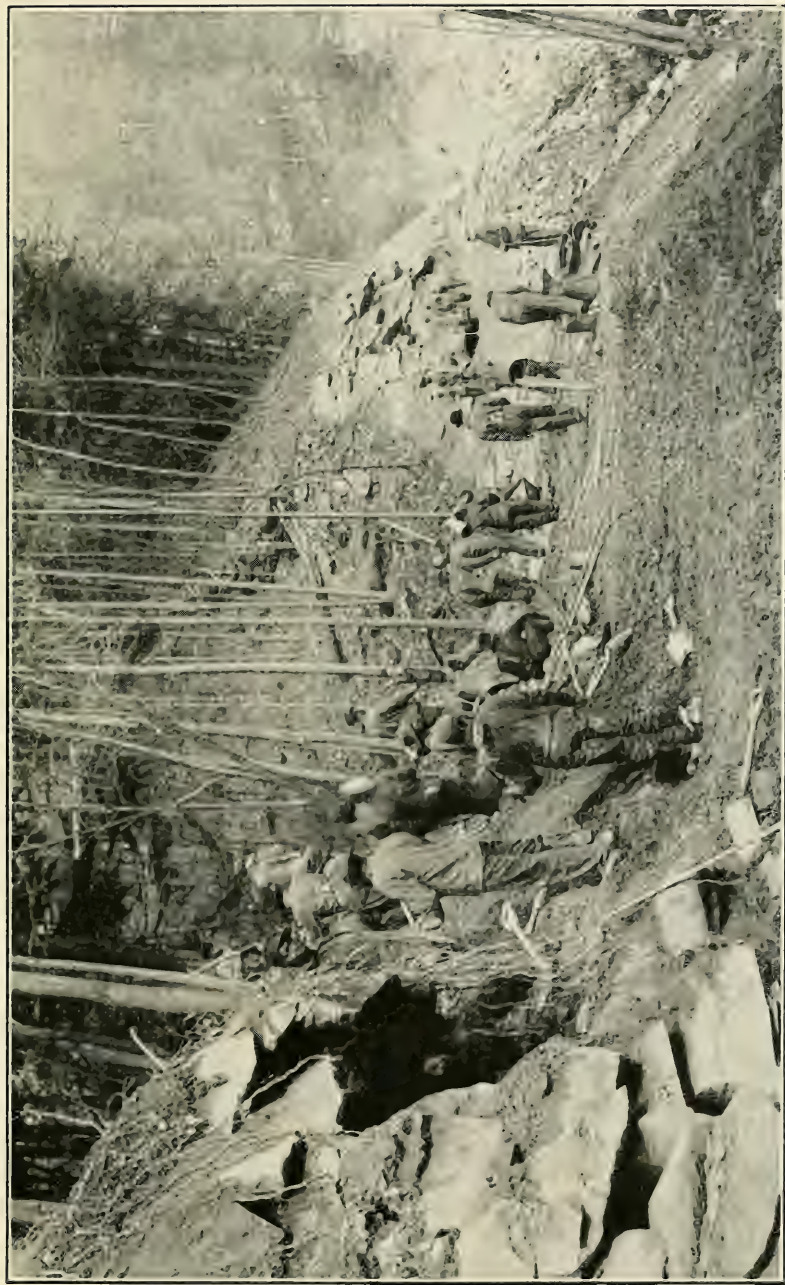


PLATE XIX—Showing prisoners at work grading new public highway along Elkhorn Creek, between Welch and Kimball, on the outcrop of a heavy sandstone ledge of the Pocahontas Group. Photo by courtesy of W. J. McClaren, Road Engineer, McDowell County.

The composition of the sample from Nos. 2, 3, 5 and 7 of the above section is published under Mine **No. 6** in the table of analyses at the end of this Chapter.

Farther up Crane Fork in the same District, Gawthrop examined the following opening:

Coal Prospect—No. 221 on Map II.

On southeast side of Crane Fork in Rocklick Branch, 2.2 miles northward from Crany P. O.; **Eagle Coal**; elevation, 2110' B.

		Ft.	In.
Sandstone			
Shale		5	0
Coal, with streaks of shale and "mother coal".....	0' 10"		
Coal, soft, columnar.....	2 3		
Shale, gray.....	0 6		
Coal, concealed, reported.....	2 0	5	7

The thickness of the Eagle Coal at **Prospect No. 222 on Map II**, located on the head of Crane Fork, is exhibited in the Pilot Knob Section— $\frac{3}{4}$ mile Southeast, published in Chapter V, page 129.

Clear Fork District, Wyoming County.

In Clear Fork District, the Eagle Coal is slightly thinner than in that last described, although still attaining minable dimensions and regularity. Here it has been mined by natives for local domestic fuel. The two following openings were examined by Gawthrop:

Cole and Crane Opening—No. 223 on Map II.

On the head of Hatfield Branch of Cub Creek, $1\frac{1}{4}$ miles southeast of Guyan P. O.; **Eagle Coal**; elevation, 1540' B.

		Ft.	In.
Concealed			
Shale, gray, silicious.....		3	0
Coal, soft columnar.....	2' 4"		
Shale, gray.....	0 2		
Coal, harder.....	0 10	Eagle	3 4
Concealed		20	0
Coal, reported, Bens Creek		1	6

Coal Opening—No. 224 on Map II.

In Easter Hollow of Cub Creek, 0.5 mile northwest of the mouth of McDonald Fork; **Eagle Coal**; elevation, 1425' B.

	Ft.	In.
Shale, dark gray.....	15	0
Coal, soft.....	2	0
Concealed		

The following opening was examined by the writer:

Coal Opening—No. 225 on Map II.

On the head of Walls Branch of Clear Fork, 2.4 miles northwest of Elklick and $5\frac{3}{4}$ miles southwest of Oceana; **Eagle Coal**; elevation, 1655' B.

	Ft.	In.
Sandstone, massive, Eagle	20	0
Shale and concealed.....	20	0
Coal, soft, columnar, opening fallen shut, and concealed	3	0

Baileysville District, Wyoming County.

In Baileysville District, the Eagle Coal is confined to several scattered patches in its western half, as shown on Figure 15, the following, examined by the writer, being the only opening observed on this bed within its borders:

Coal Opening—No. 226 on Map II.

On the south hillside of Clear Fork, slightly over a mile southwest of Elklick, and 2 miles northwest of Baileysville; **Eagle Coal**; elevation, 1815' B.

	Ft.	In.
Shale		
Coal, soft .....4' 0"		
Slate, gray.....0 1		
Coal, harder (slate floor).....1 0	5	1

The above opening had fallen shut when visited during 1914, but the section was furnished by a native—Mr. W. A. Graham.

Huff Creek District, Wyoming County.

In Huff Creek District the Eagle Coal attains fine development and is confined to several scattered patches as shown

on Figure 15. The following opening in the southwest border of the District was examined by Gawthrop:

Coal Opening—No. 227 on Map II.

On the head of Muzzle Fork, 1.4 miles south of Botsford P. O.;
Eagle ("Middle War Eagle") Coal; elevation, 1690' B.

			Ft.	In.
Sandstone, massive.....			3	0
Fire clay shale.....			0	6
Coal, gas, medium hard.....	0'	7"		
Coal, gas, hard.....	1	0		
Shale, gray.....	0	1		
Coal, softer.....	1	9	Eagle	3 5
<hr/>				
Fire clay and concealed (by hand-level).....			48	0
Coal, Bens Creek, opening closed, reported.....			3	2

The above opening is within $\frac{1}{4}$ mile of the McDowell County Line in a region where the Bens Creek Coal has developed importance. The thickness and bed section of the Eagle ("Middle War Eagle") Coal at **Opening No. 227A on Map II**, located on the hill road on the head of Little Cub Creek, are given in the Botsford Section in Chapter V, pages 134-5.

Center District, Wyoming County.

In Center District, the Eagle Coal is confined to 30 to 50 acres in the extreme northwestern corner, but no exposures either at prospects or outcrop were observed in this region. However, it probably has the same thickness and character as exhibited in the foregoing openings in other portions of Wyoming County.

Sandy River District, McDowell County.

In Sandy River District, the Eagle ("Middle War Eagle") Coal probably attains its best development in either County, and has been mined quite extensively on a commercial scale. As shown on Figure 15, it is confined to several scattered patches in the northwest half of the District. In the northern edge of the latter, this bed has been prospected considerably on the waters of Longpole Creek, the following opening, examined by the writer, being in this region:

Coal Prospect—No. 230 on Map II.

On the east side of Longpole Creek and road, 1.1 miles southwest of Botsford P. O.; **Eagle** ("Middle War Eagle") **Coal**; elevation, 1605' B.

		Ft.	In.
Slate, black, with plant and marine fossils.....		1	0
Coal	0' 1"		
Slate, gray.....	0 6		
Coal , soft.....	1 8		
Slate, gray, 1" to.....	0 2		
Coal , soft.....	1 4	3	9

On the same creek and in the same District, the thickness and bed section at **Coal Prospects Nos. 231, 232 and 233 on Map II** are given in the special section of the Kanawha Group in Chapter V for Head of Longpole, Longpole P. O.—North, and Longpole P. O.—Northeast, pages 135-6, 136 and 137, respectively; and also at **Prospect No. 234 on Map II**, in the section given in Chapter IV for Mouth of Longpole. The two following openings were examined by the writer:

Coal Opening—No. 235 on Map II.

On north hillside of Panther Branch of Longpole Creek, 0.5 mile northeast of Longpole P. O.; **Eagle** ("Middle War Eagle") **Coal**; elevation, 1705' B.

	Ft.	In.
Sandstone, massive, Eagle	10	0
Shale, gray.....	3	0
Slate, black, calamite stems and fruit abundant..	4	0
Coal , soft, columnar, clean (slate floor).....	5	8

Coal Opening—No. 236 on Map II.

On branch of Fourpole Creek, $2\frac{3}{4}$ miles northeast of Mohawk and 1.3 miles northwest of Longpole P. O.; **Eagle** ("Middle War Eagle") **Coal**; elevation, 1550' B.

		Ft.	In.
Sandstone, massive, Eagle		10	0
Coal , gas, medium hard.....	0' 6"		
Slate, dark gray.....	0 $0\frac{1}{4}$		
Coal , gas, medium hard.....	2 0		
Slate, dark gray.....	0 $0\frac{1}{2}$		
Coal , gas.....	0 1		
Slate, dark gray.....	0 $0\frac{1}{2}$		
Coal , gas, medium hard.....	3 6	6	$2\frac{1}{4}$

Slate and concealed.....

The thickness, section and mine data at the commercial **Mine No. 8 on Map II** of the Mohawk Coal & Coke Co. in this bed, as determined by the writer, are published on pages 328-9

of Volume II(A) of the State Geological Survey Reports, and the composition of a sample collected also by the writer at this mine, is given under No. 8 in the table of coal analyses at the end of this Chapter. The stratigraphic position of this coal is exhibited in the Mohawk Section given in Chapter IV, pages 86-7.

The two following commercial mines in the Eagle ("Middle War Eagle") Coal were examined and sampled for analysis by Gawthrop:

Lathrop Coal Co.—No. 9 on Map II.

Sandy River District, 0.4 mile northwest of Panther; **Eagle** ("Middle War Eagle") Coal.

		Ft.	In.
1. Concealed			
2. Sandstone, massive, gray.....		10	0
3. Coal, gas, hard.....0'	6 "		
4. Coal, gas, medium hard...0	9		
5. Coal, splint.....0	2		
6. Coal, gas, hard.....0	7		
7. Shale, gray.....0	0½		
8. Coal, gas, medium soft...0	3		
9. Shale, gray.....0	0½		
10. Coal, gas, hard.....0	5		
11. Coal, splinty.....1	0		
12. Coal, gas, hard.....2	2		
13. Fire clay shale.....0	1		
14. Coal, gas, medium hard...0	5	6	5
15. Shale and concealed.....			

"Tidal elevation, 1649' L.; coal owned by Sibley Coal & Coke Co.; principal office, Welch; daily capacity, 900 tons; daily output, 800 tons; 20 laborers and 100 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5, 6, 8, 10, 11, 12 and 14 of section in Room No. 5 off 2nd Left Heading by R. M. Gawthrop; G. C. Cole, Bookkeeper, authority for data. Coal is washed and sorted at tipple."

Panther Coal Co. No. 1—No. 10 on Map II.

Sandy River District, 0.8 mile east of Douglas; **Eagle** ("Middle War Eagle") Coal.

		Ft.	In.
1. Concealed			
2. Sandstone, massive, gray.....		12	0
3. Coal, soft, gas.....1'	4½"		
4. Fire clay shale.....1	4		
5. Coal, soft, gas.....0"	4½		
6. Coal, hard, splinty.....0	8		
7. Coal, medium soft.....1	7		
8. Coal, gas, soft.....1	0	6	4
9. Shale and concealed.....			

"Elevation, 1795' L.; coal owned by Sibley Coal & Coke Co.; principal office, Welch; daily capacity, 400 tons; daily output, 300 tons; 50 laborers and 50 miners employed; electric haulage; used for steam on N. & W. Ry.; shipped East and West; butts N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 5, 6, 7 and 8 of section in Room No. 2 off 1st Left Heading, by R. M. Gawthrop; W. E. Haddon, Bookkeeper, authority for data."

The two following openings were examined by the writer:

Coal Opening—No. 237 on Map II.

On head of Johnnycake Branch, 0.8 mile east of intersection of public road with McDowell-Wyoming County Line; **Eagle** ("Middle War Eagle") Coal; elevation, 1890' B.

		Ft.	In.
Sandstone, light gray, soft, medium grained, Eagle		50	0
Coal, medium soft, columnar.	2' 0"		
Slate, black, 0" to.....	0 0 $\frac{1}{8}$		
Coal, medium soft, columnar.	1 7		
Slate, dark gray, $\frac{1}{8}$ " to.....	0 0 $\frac{1}{4}$		
Coal, medium soft, columnar.	2 7 Eagle	6	2 $\frac{3}{8}$
Slate and concealed and shale (by hand-level)...		37	0
Coal, Bens Creek, with partings.....		3	4

Coal Opening—No. 238 on Map II.

On west hillside of Road Fork of Bull Creek, 0.6 mile southward from mouth of former, 2.8 miles westward from Panther; **Eagle** ("Middle War Eagle") Coal; elevation, 1540' B.

		Ft.	In.
Concealed			
Sandstone, massive, buff, medium grained, Eagle ..		3	0
Slate, black, calamite fossil plants abundant....		0	1
Coal, gas, hard.....	1' 5"		
Slate, gray.....	0 1		
Coal, gas, hard.....	1 3	2	9
Slate, gray.....		4	4
Sandstone, massive.....			

The following opening was examined by Gawthrop:

Coal Opening—No. 239 on Map II.

On east hillside of Greenbrier Fork of Panther Creek, 3.2 miles southwest of Panther Station; **Eagle** ("Middle War Eagle") Coal; elevation, 1740' B.

		Ft.	In.
Shale, gray.....			
Coal, hard.....	1' 8"		
Slate	0 6		
Coal, hard (slate floor).....	1 2	3	4

The following opening was examined by the writer:

Coal Opening—No. 240 on Map II.

On head of Bull Creek, on west side of road, 0.3 mile northeast of Virginia State Line; **Eagle** ("Middle War Eagle") Coal; elevation, 1455' B.

		Ft.	In.
Concealed and shale.....			
Coal, soft.....	0' 11"		
Shale, gray.....	0	8	
Coal, harder.....	2	0	
Shale, dark gray.....	3	0	
Coal, slaty (slate floor).....	1	0	7 7

Quantity of Eagle ("Middle War Eagle") Coal Available.

Based on the evidence given in the foregoing pages, and a planimetric determination of the area from Map II by Gawthrop, the following estimate is made for the probable amount of the Eagle Coal. No deduction has been made for the amount already mined, as this is insignificant when compared to the total:

Probable Amount of Eagle Coal.

Counties by Districts.	Thickness of Coal Assumed.	Square Miles.	Acres	Cubic Feet of Coal	Short Tons of Coal
Wyoming:					
Oceana	3	61.50	39,360	5,143,564,800	205,742,592
Clear Fork.....	3	23.30	14,912	1,948,700,160	77,948,006
Baileysville	4	1.35	864	150,543,360	6,021,734
Huff Creek.....	4	4.90	3,136	546,416,640	21,856,665
Slab Fork.....	4	0.75	480	83,635,200	3,345,408
Center	4	0.05	32	5,575,680	223,027
Totals.....		91.85	58,784	7,878,435,840	315,137,432
McDowell:					
Sandy River.....	4	11.30	7,232	1,260,103,680	50,404,147
Browns Creek...	4	0.01	6	1,115,136	44,605
Totals.....		11.31	7,238	1,261,218,816	50,448,752
Totals for Both Counties..		103.16	66,022	9,139,654,656	365,586,184

THE BENS CREEK COAL.

The Bens Creek Coal, described in Chapter V, pages 155-6, attains minable dimensions in Huff Creek and Baileysville

Districts, and in the southern edge of Clear Fork District, Wyoming County; and in the northwest half of Sandy River District, McDowell, as shown by its approximate minable area on Figure 27 along with that for the No. 4 Pocahontas bed. On the pages last mentioned, its correlation is suggested as a "split" off the Eagle Coal proper of the Kanawha River region. No sample for analysis was obtained from the bed in the territory of this Report, but its composition at an opening in the immediately adjoining District of Stafford, Mingo County, on the east hillside of Bens Creek, 3.3 miles northeast of Wharncliffe, is given on page 689 of the Logan-Mingo Report of the State Survey. The percentage of sulphur—3.30—is excessive and it is not believed to be representative of this seam, as a glance at the table of analyses on pages 720-9 of the same Report shows that the average amount of sulphur in the basal coals of the Kanawha Group is less than $1\frac{1}{2}$ per cent.

Huff Creek District, Wyoming County.

In Huff Creek District, the thickness of the Bens Creek Coal is shown in the following opening, examined by Gawthrop:

Coal Opening—No. 241 on Map II.

On head of Muzzle Fork, 1.3 miles south of Botsford; elevation, 1640' B.

	Ft.	In.
Coal, Eagle, at No. 227 on Map II.....	3	5
Shale, and concealed, (by hand-level).....	48	0
Coal opening, fallen shut, Bens Creek.....	3	2

An opening in this coal in the southwest edge of the same District occurs along the hill road on the head of Little Cub Creek, 35 feet below the Eagle ("Middle War Eagle") Coal, as shown by the Botsford Section, given in Chapter V, pages 134-5.

Clear Fork and Baileysville Districts, Wyoming County.

In Clear Fork and Baileysville Districts, no exposures either at prospects or outcrop were observed on the Bens Creek Coal, but it is probably present with smaller thickness over the region designated for it on Figure 27.

Sandy River District, McDowell County.

In Sandy River District, the Bens Creek Coal attains its best development, where it has been prospected considerably by natives and land holding companies. In the northern edge of the District, the following opening was examined by the writer:

Coal Opening—No. 242 on Map II.

On head of Johnnycake Branch, 0.8 mile east of the intersection of the public road with the McDowell-Wyoming County Line; **Bens Creek Coal**; elevation, 1855' B.

		Ft.	In.
Coal, Eagle , at Opening No. 237 on Map II.....		6	2 $\frac{3}{8}$
Slate and concealed and shale, sandy, (by hand-level).....		34	0
Slate, black, fossil plants, 0" to.....		0	2
Coal , soft, columnar.....	2' 1"		
Slate, black.....	0 0 $\frac{1}{4}$		
Coal , soft.....	0 1		
Slate, black.....	0 0 $\frac{1}{4}$		
Coal , soft, columnar.....	0 4 $\frac{1}{2}$		
Coal , slaty.....	0 1		
Coal , soft.....	0 4		
Slate, gray.....	0 0 $\frac{1}{2}$		
Coal , soft (slate floor).....	0 3 $\frac{1}{2}$	Bens Creek	3 4

Westward in the same District, this coal has been prospected on the waters of Longpole Creek, and in the latter region, its thickness and bed structure at **Prospects Nos. 243, 244 and 245 on Map II**, are shown in the sections in Chapter V for Head of Longpole, Longpole P. O.—North, and Longpole P. O.—Northeast. pages 135-6, 136, and 137, respectively.

In the southwestern edge of Sandy River District, the two following openings were examined by the writer:

Coal Prospect—No. 246 on Map II.

Six-tenths mile northwest of low gap on head of Road Fork of Bull Creek, and 4.1 miles southwest of Panther; **Bens Creek Coal**; elevation, 1575' B.

	Ft.	In.
Concealed		
Sandstone, flaggy and shaly.....	3	0
Coal , s'aty.....	0' 1"	
Shale, gray.....	0 7	

			Ft.	In.
Coal, soft.....	1'	11"		
Shale, gray.....	0	2		
Coal, soft.....	0	3		
Slate, gray.....	0	1		
Coal, soft (slate, gray, floor)...	9	.....	3	10

Coal Opening—No. 247 on Map II.

Four-tenths mile southwest of Prospect No. 246 on Map II; **Bens Creek Coal**; elevation, 1585' B.

	Ft.	In.
Concealed		
Coal, soft.....	1	8
Slate and unrecorded (by aneroid).....	185	0
Limestone, Eagle , dark, brittle, in black shale....	0	6

Quantity of Bens Creek Coal Available.

Based on the evidence given above and a determination of its minable area as shown on Figure 27 by interpolation between that of the Eagle and Little Eagle beds, the following estimate is made for the amount of Bens Creek Coal available, none having been mined commercially:

Probable Amount of Bens Creek Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Clear Fork.....	2	1.5	960	83,635,200	3,345,408
Baileysville.....	2	1.0	640	55,756,800	2,230,272
Huff Creek.....	2	7.0	4,480	390,297,600	15,611,904
Totals.....	.....	9.5	6,080	529,689,600	21,187,584
McDowell:					
Sandy River.....	2	17.0	10,880	947,865,600	37,914,624
Browns Creek...	2	0.1	64	5,575,680	223,027
Totals.....	.....	17.1	10,944	953,441,280	38,137,651
Totals for Both Counties..	.....	26.6	17,024	1,483,130,880	59,325,235

THE LITTLE EAGLE COAL.

The **Little Eagle Coal**, described in Chapter V, page 157, is a very important bed, especially in Wyoming County, as shown on Figure 16. It has never been mined commercially in either County, but has been opened by natives for local domestic fuel. Its area is confined to Oceana, Clear Fork, Baileysville, Huff Creek and Slab Fork Districts in Wyoming; and Sandy River and Browns Creek Districts in McDowell. Its outcrop may be readily determined in the region of its occurrence, since it belongs usually less than 100 feet below that of the Eagle bed, the details of which are given on Map II.

Oceana District, Wyoming County.

Oceana District contains about 50 per cent. of the acreage of Little Eagle Coal in both Counties, and within its borders this bed has been prospected quite extensively both by natives and land holding companies. In the northwest portion the two following openings on the waters of Huff Creek were examined by the writer:

Coal Opening—No. 248 on Map II.

On the north hillside of Huff Creek, 1.4 miles northwest of Campus; **Little Eagle Coal**; elevation, 1060' B.

		Ft.	In.
Concealed			
Shale, buff, sandy, plant fossils abundant.....		8	0
Coal , soft.....	0' 3"		
Slate, gray.....	0 0½		
Coal , soft.....	0 10¾		
Slate, black.....	0 0¼		
Coal , soft (slate floor).....	1 0	2	2½

Coal Opening—No. 249 on Map II.

On the south hillside of Huff Creek, 0.9 mile northwest of Campus and just below mouth of Toney Fork; **Little Eagle Coal**; elevation, 1090' B.

		Ft.	In.
Sandstone		3	0
Shale, gray, fossil plants.....		3	0
Coal , soft, columnar.....	0' 3"		
Slate, black, soft.....	0 0½		
Coal , soft, columnar (slate floor)	2 6	2	9½



Figure 16.—Showing Approximate Minable Area of the Little Eagle Coal (See explanations in Author's Preface).

The following opening was examined by Gawthrop:

Coal Opening—No. 250 on Map II.

One mile southeast of Campus, on south hillside of Lower Gap Branch of Huff Creek; **Little Eagle Coal**; elevation, 1310' B.

	Ft.		In.	
Sandstone, massive, Decota	30	0		
Slate, black, sandy.....	6	0		
Coal, soft.....	0'	3"		
Slate, black.....	0	0½		
Coal, soft, columnar (shale floor)	1	10	2	1½

A sample for analysis was collected and the following data obtained by Gawthrop and the writer at an opening farther east on the waters of Huff Creek:

A. H. Cook Coal Opening—No. 11 on Map II.

One mile south of Swope; **Little Eagle Coal**; elevation, 1315' B.

		Ft.	In.
Sandstone, visible, Decota		15	0
Shale, buff, sandy.....		2	0
Coal, soft.....	0' 2"		
Slate, $\frac{1}{4}$ " to.....	0 0 $\frac{1}{2}$		
Coal, soft (slate floor).....	1 10	2	0 $\frac{1}{2}$

The composition of the sample from both benches is published under **No. 11** in the table of coal analyses at the end of this Chapter. Farther up Huff Creek, the following opening was examined by Gawthrop:

Coal Opening—No. 251 on Map II.

On north bank of Huff Creek, 0.2 mile southwest of Swope; **Little Eagle Coal**; elevation, 1230' B.

		Ft.	In.
Shale, gray, silicious.....			
Coal, soft.....	0' 2"		
Slate, dark.....	0 0 $\frac{1}{2}$		
Coal, soft, columnar (shale floor)	1 10 $\frac{1}{2}$	2	1

The three following openings on the waters of Huff Creek in the same District were examined by the writer:

Coal Opening—No. 252 on Map II.

On the south hillside of Huff Creek, near school house at Swope; **Little Eagle Coal**; elevation, 1245' B.

		Ft.	In.
Shale, dark, sandy.....		6	0
Coal, soft.....	0' 2"		
Slate, black, $\frac{1}{4}$ " to.....	0 0 $\frac{1}{2}$		
Coal, soft (slate floor).....	1 10	2	0 $\frac{1}{2}$

At Swope, the **Little Eagle Coal** belongs 40 to 50 feet above the marine fossiliferous **Eagle Limestone** and **Shale**.

Coal Opening—No. 253 on Map II.

On the north bank of Huff Creek, 0.5 mile northeast of Swope; **Little Eagle Coal**; elevation, 1240' B.

		Ft.	In.
Sandstone, flaggy.....		5	0
Coal, soft.....	0' 2"		
Slate	0 0½		
Coal	1 6	1	8½
Slate, gray, to Huff Creek.....		3	0

Coal Opening—No. 254 on Map II.

On north bank of Coal Fork of Huff Creek, 0.4 mile southeast of Swope; **Little Eagle Coal**; elevation, 1250' B.

		Ft.	In.
Shale, flaggy, buff.....			
Coal, soft.....	0' 2"		
Slate, gray.....	0 0¼		
Coal, soft.....	1 9	1	11¼
Slate and concealed to Coal Fork.....		20	0

Coal Opening—No. 255 on Map II.

Near mouth of Sycamore Creek, 0.9 mile northeast of Swope; **Little Eagle Coal**; elevation, 1265' B.

	Ft.	In.
Slate, dark, silicious.....	10	0
Coal, soft, columnar (shale floor).....	1	10

The two following openings, located farther up Huff Creek, examined by the writer, are interesting, in that they show the Cedar bed to be a "split" off the Little Eagle Coal proper of the Kanawha River region:

Coal Prospect—No. 256 on Map II.

On the north hillside of Huff Creek, 1.3 miles northeast of Swope and opposite mouth of Slickrock Branch; **Little Eagle and Cedar Coals**.

	Ft.	In.
1. Sandstone, Decota		
2. Shale, dark, flaggy and sandy.....	15	0
3. Coal, soft.....	0' 5"	} Little Eagle (1345' B.)
4. Slate, dark.....	0 0¼	
5. Coal, soft.....	1 9¾	
6. Slate, black, flaggy.....	23	0
7. Coal, slaty.....	0' 5"	} Cedar
8. Coal, soft.....	1 2	
9. Slate, black, with iron ore nodules.....	20	0
10. Limestone, Eagle , lenticular.....	0	6

Coal Opening—No. 257 on Map II.

On the northwest hillside of Huff Creek, 0.9 mile due east of Prospect No. 256 above and just north of mouth of Straight Fork; **Little Eagle Coal**; elevation, 1375' B.

			Ft.	In.
1.	Sandstone, massive, Decota		35	0
2.	Slate, black.....		15	0
3.	Coal, soft.....	0' 2"		
4.	Slate, black.....	0 0 $\frac{1}{4}$		
5.	Coal, soft.....	1 10 $\frac{3}{4}$		
6.	Slate, gray.....	0 6		
7.	Coal, bony.....	0 7		
8.	Coal, soft (slate floor)....	0 11	4	1

Slate No. 6 in each of the two sections last given represents the same formation, which has thinned down from 23 feet at Prospect No. 256 to only 6 inches at Opening No. 257, permitting the latter to be driven on both the Cedar and the Little Eagle as the latter is represented westward on the waters of Huff Creek. On the south side of Huff Mountain on the drainage of Clear Fork, the Little Eagle Coal generally carries this same gray slate—3 to 6 inches in thickness—slightly below the middle.

On the west bank of Dingess Fork, 0.3 mile southeast of Opening No. 257, last described, Gawthrop obtained the following:

Coal Opening—No. 258 on Map II.

			Ft.	In.
1.	Shale, gray, silicious.....			
2.	Coal, soft, columnar.....	2' 1"		
3.	Shale, gray $\frac{1}{2}$ " to.....	0 1		
4.	Coal, soft.....	0 1		
5.	Shale, gray.....	0 0 $\frac{1}{2}$ Little Eagle		
6.	Coal, soft (shale floor)....	1 1 $\frac{1}{2}$ (1375' B.)	3	5

In the above section, the gray shale—No. 3—is the same as formation No. 6 in the sections given for the two preceding openings, having thinned down here to even less than one inch.

The two following openings, on the south side of Huff Mountain on the waters of Clear Fork, were examined by Gawthrop:

Coal Opening—No. 259 on Map II.

On the west bank of Upper Road Branch, 1 mile northwest of Oceana; **Little Eagle Coal**; elevation, 1500' B.

	Ft.	In.
Shale, gray.....	6	0
Coal, soft (shale floor).....	2	9

Coal Opening—No. 260 on Map II.

On the east bank of Dry Fork, 1 mile northeast of Oceana; **Little Eagle Coal**; elevation, 1630' B.

	Ft.	In.
Sandstone, massive, Decota , visible.....	5	0
Coal, soft (opening closed), reported.....	4	0

Slightly over one-half mile southward, on the east hillside of Dry Fork, the writer examined the following opening on this bed:

Coal Opening—No. 261 on Map II.

	Ft.	In.
Sandstone, making great cliff, Decota	40	0
Concealed	15	0
Shale	5	0
Coal, soft (opening closed), estimated to floor of drift, Little Eagle (1675' B.).....	4	0

The thickness and stratigraphic position of the **Little Eagle Coal** at **Opening No. 262 on Map II**, on the northwest hillside of Clear Fork, at Oceana, are shown in the Oceana Section, in Chapter V, page 61.

On the south hillside of the same stream at Oceana, the writer examined the following opening in this coal:

Coal Opening—No. 263 on Map II.

	Ft.	In.
Bench for Eagle Coal	15	0
Sandstone, massive, Decota	15	0
Concealed, steep slope, mostly sandstone.....	40	0
Concealed, mostly shale.....	20	0
Coal, soft, (closed), reported 42", with 3" to 4" of slate just below middle, Little Eagle , (1700' B.)	3	6

The three following openings, on the waters of Clear Fork in the southwest edge of Oceana District, were examined by the writer:

Floyd Cook Coal Opening—No. 264 on Map II.

On northwest hillside of Clear Fork, $1\frac{3}{4}$ miles southwest of Oceana; **Little Eagle Coal**; elevation, 1555' B.

	Ft.	In.
Concealed		
Shale, dark, flaggy, with plant fossils and iron ore nodules	15	0
Coal, soft , (opening closed), reported 42" thick by Lavelet Cook.....	3	6

Coal Opening—No. 265 on Map II.

On the north bank of Jacob Cook Branch, slightly over a mile west of mouth of Lower Road Branch; **Little Eagle Coal**; elevation, 1535' B.

	Ft.	In.
Sandstone, Decota , visible.....	5	0
Shale, dark gray, with plant fossils and iron ore nodules	15	0
Coal, soft.....2' 1"		
Shale, gray.....0 1		
Coal, soft, columnar.....1 6	3	8
Slate and concealed to bed of Branch.....	15	0

The parting shale in the above opening is the same as that referred to on a preceding page immediately following the descriptions of Openings Nos. 256 and 257 on Map II. Here, it is shown to belong slightly below the middle of the bed, a feature that prevails throughout the drainage of Clear Fork.

Lavelet Cook Coal Opening—No. 266 on Map II.

In ravine, 1 mile southwest of Oceana, and 0.4 mile north of mouth of Lower Road Branch; **Little Eagle Coal**; elevation, 1580' B.

	Ft.	In.
Sandstone, platy, Decota	40	0
Shale, dark, sandy, flaggy, fossil plants.....	20	0
Coal, soft (opening closed), reported 42" (slate floor)	3	6

The three following openings were examined by Gawthrop:

Estill Walker Coal Opening—No. 267 on Map II.

Two miles southeast of Oceana and 0.6 mile northeast of Edith;
Little Eagle Coal; elevation, 1940' B.

		Ft.	In.
Shale, silicious, visible.....		8	0
Coal, soft	2' 0"		
Shale, gray.....	1 2		
Coal, soft (shale floor).....	1 4	4	6

W. Cook Coal Opening—No. 268 on Map II.

On head of Cabin Branch of Laurel Fork, 1.4 miles due north of Jesse; **Little Eagle Coal**; elevation, 1795' B.

		Ft.	In.
Shale, dark gray, silicious.....			
Coal, soft.....	1' 2"		
Coal, soft, columnar.....	1 2	2	4

The D. J. Cook Coal Opening—No. 269 on Map II, on the north hillside of Clear Fork, 0.4 mile east of Oceana, at an elevation of 1700' B., as determined by Gawthrop, had fallen shut when visited by the latter. This is in the Little Eagle Coal, which is reported to have about the same thickness as those described above for this locality.

The following opening was examined by the writer:

Coal Opening—No. 270 on Map II.

On head of Simmons Fork of Clear Fork, 2.8 miles due east of Oceana; **Little Eagle Coal**; elevation, 1910' B.

		Ft.	In.
Shale, dark, sandy.....		7	0
Coal, soft, columnar.....	2' 2"		
Shale, gray.....	1 8		
Coal, soft, columnar (slate floor)	1 8	5	6

Farther up Clear Fork, the two following openings were examined by Gawthrop:

Coal Opening—No. 271 on Map II.

On west hillside of Ralph Branch of Clear Fork, 0.6 mile northward from mouth of former; **Little Eagle Coal**; elevation, 1855' B.

	Ft.	In.
Sandstone, massive, Decota , visible.....	10	0
Concealed	10	0
Shale, gray, sandy.....	10	0
Coal, soft, (concealed by water), reported 4 feet with 3" parting.....	4	0

A. R. Wittenberg Coal Opening—No. 272 on Map II.

In ravine on north side of Clear Fork, 0.9 mile due east of Opening No. 271 last described; **Little Eagle Coal**; elevation, 1875' B.

		Ft.	In.
Shale, gray.....			
Coal, slaty.....	0'	3"	
Coal, soft, columnar.....	1	10	
Shale, gray.....	0	6	
Coal, soft.....	0	1½	
Shale, gray.....	0	2½	
Coal, soft, columnar (slate floor)	1	4	3

A sample for analysis and the following data were obtained by the writer at an opening in this bed:

Coal Opening—No. 12 on Map II.

In ravine on northwest side of Clear Fork, 0.5 mile southwest of mouth of Crane Fork; **Little Eagle Coal**; elevation, 1935' B.

		Ft.	In.
1. Concealed			
2. Sandstone, flaggy, Decota		2	0
3. Shale, dark, sandy.....		6	0
4. Bone	0'	1½"	
5. Coal, soft.....	0	6	
6. Bone	0	1½	
7. Coal, soft, columnar (slate, gray, floor).....	3	0	3 9

The composition of the sample, from No. 7 only of the above section, is published under **No. 12** in the table of coal analyses at the end of this Chapter.

The following opening was examined by the writer:

Coal Opening—No. 273 on Map II.

On the south hillside of Clear Fork, ¾ mile southeast of mouth of Crane Fork; **Little Eagle Coal**; elevation, 2175' B.

		Ft.	In.
Concealed			
Shale, sandy, dark.....		2	0
Sandstone		1	0
Shale, dark, sandy.....		8	0
Coal, bony.....	0'	1"	
Coal, soft.....	2	0	
Slate, gray	0	7	
Coal, medium soft (slate floor).....	2	0	4 8

The following opening, examined by the writer and located in the northeastern point of Oceana District, appears to be in this bed:

Coal Prospect—No. 273A on Map II.

In ravine on north hillside of Rockhouse Fork of Clear Fork, 1 mile northeast of mouth of Wolfpen Branch; **Little Eagle Coal?**; elevation, 2470' B.

	Ft.	In.
Concealed		
Shale, buff		
Coal, medium, soft (slate floor).....	5	2

Clear Fork District, Wyoming County.

In Clear Fork District, the Little Eagle Coal has been prospected and mined, both by natives and the large land holding companies, and it attains about the same development as in the area last described. The four following openings within this District, all on the waters of Cub Creek, were examined by Gawthrop:

Coal Opening—No. 274 on Map II.

On west bank of Sturgeon Branch of Cub Creek, 1.1 miles due west of mouth of Hatfield Branch; **Little Eagle Coal**; elevation, 1235' B.

		Ft.	In.
Shale, gray, silicious.....		6	0
Coal, slaty.....	0' 2"		
Shale, gray, plant fossils....	4 0		
Coal, soft.....	0 5		
Coal, bony.....	0 2½		
Coal, soft, columnar.....	1 11½	6	9
Shale and concealed.....			

Coal Opening—No. 275 on Map II.

One mile and a quarter up Sycamore Branch of Cub Creek; **Little Eagle Coal**; elevation, 1255' B.

	Ft.	In.
Shale, gray, silicious.....	5	0
Coal, medium soft (shale and concealed floor)....	1	10

Only the upper bench of the Little Eagle Coal proper of the Kanawha Valley is represented in the two sections last given, the lower having split off to form the Cedar Coal, 25 to 40 feet lower in the measures.

Coal Opening—No. 276 on Map II.

On west bank of Cub Creek, $\frac{1}{8}$ mile below mouth of Tantrough Hollow and 2 miles northeast of Guyan; **Little Eagle Coal**; elevation, 1390' B.

			Ft.	In.
Shale, gray, silicious.....			5	0
Coal, soft.....	0'	1½"		
Shale	0	3½		
Coal, medium soft.....	2	0	2	5
<hr/>				
Shale and concealed.....				

Coal Opening—No. 277 on Map II.

One-half mile up McDonald Fork of Cub Creek, $\frac{3}{4}$ miles northeast of Guyan; **Little Eagle Coal**; elevation, 1420' B.

		Ft.	In.
Shale, dark gray, silicious.....		5	0
Coal, soft (shale and concealed floor).....		1	7

The following opening was examined by the writer:

Coal Opening—No. 278 on Map II.

On waters of Reedy Branch, 1.3 miles N. 75° W. of Simon; **Little Eagle Coal**; elevation, 1620' B.

			Ft.	In.
Shale, greenish gray at top, dark at bottom, plant fossils				
Coal, soft, columnar	2'	5"		
Slate, gray	0	1		
Coal, soft (slate and concealed floor).....	0	6	3	0

Coal Opening—No. 279 on Map II, located on the west hillside of Reedy Branch, 1.2 miles northward from Uno P. O., and 2.5 miles north of Simon, at an elevation of 1535' B., had fallen shut when visited by Gawthrop, but the Little Eagle Coal is reported here to be 26 inches in thickness by Connie Walls.

The four following openings in Clear Fork District were examined by the writer:

Coal Opening—No. 280 on Map II.

On west hillside of Walls Branch, 1.2 miles northwest of its mouth, and 2.3 miles northwest of Ellick; **Little Eagle Coal**; elevation, 1565' B.

		Ft.	In.
Sandstone, massive, Decota , visible.....		5	0
Shale, bluish gray, sandy.....		6	0
Coal , soft.....	1' 1"		
Slate, gray.....	0 0½		
Coal , soft.....	1 1½		
Slate, gray.....	0 1		
Coal	—	2	4

Lee Harvey Coal Opening—No. 281 on Map II.

On west hillside of Cedar Creek, near head of latter and 2¼ miles northwest of Ellick; **Little Eagle Coal**; elevation, 1645' B.

	Ft.	In.
Concealed		
Shale, black, with fossil calamite and marine fossils abundant.....	5	0
Coal , soft, columnar (slate, gray, floor).....	2	6

The marine fossils in the roof shale of the Little Eagle Coal at the above opening are very similar to the forms found in the same shale at Opening No. 262 on Map II, described on a preceding page.

Jos. P. Cook Coal Opening—No. 282 on Map II.

On head of Doublecamp Branch of Clear Fork, on west bank, 2.5 miles northwest of Ellick; **Little Eagle Coal**; elevation, 1540' B.

	Ft.	In.
Concealed		
Shale, sandy, plant fossils abundant.....	11	0
Coal , medium soft, columnar (slate floor).....	2	4

Jos. P. Cook Coal Opening—No. 283 on Map II.

On east hillside of Doublecamp Branch, 0.5 mile southeast of Opening No. 282 last described; **Little Eagle Coal**; elevation, 1600' B.

	Ft.	In.
Concealed		
Shale, sandy, flaggy, bluish gray.....	15	0
Coal , medium soft, columnar, 24" to.....	2	3
Slate, gray	1	6
Concealed to Branch.....	6	0

In the eastern point of Clear Fork District, the following opening was examined by Gawthrop:

Cole and Crane Coal Prospect—No. 284 on Map II.

On the head of Ellick Branch of Clear Fork, 2.3 miles east of Ellick P. O.; **Little Eagle Coal**; elevation, 2010' B.

			Ft.	In.
Shale, gray, sandy.....			5	0
Coal , soft.....	0'	9"		
Bone	0	1		
Coal , soft, visible.....	1	6		
Coal , concealed by water, but reported	2	2	4	6

In the southern point of the same District, the writer examined the following opening:

Lincoln Adams Coal Opening—No. 285 on Map II.

On head of the left fork of Big Branch, $\frac{1}{4}$ mile southeast of Lincoln P. O.; **Little Eagle Coal**; elevation, 1645' B.

			Ft.	In.
Concealed				
Shale, buff, sandy.....			7	0
Coal , soft.....	0'	2"		
Slate, black.....	0	0 $\frac{1}{4}$		
Coal , soft.....	2	0		
Slate, gray.....	0	5		
Coal , soft (slate floor).....	0	3	2	10 $\frac{1}{4}$

Huff Creek District, Wyoming County.

In Huff Creek District, the Little Eagle Coal has not been prospected so extensively as in the two last described, but it probably attains practically the same development. In its northern border the following opening was examined by Gawthrop:

Coal Opening—No. 286 on Map II.

In ravine on south hillside of Little Huff Creek, 0.5 mile southeast of mouth of Little Cub Creek; **Little Eagle Coal**; elevation, 1415' B.

	Ft.	In.
Sandstone, shaly, rotten, Decota	8	0
Shale, gray, with plant fossils.....	3	0

			Ft.	In.
Coal, soft.....	0'	4½"		
Coal, soft, columnar.....	1	7		
Slate, gray, 1" to.....	0	0½		
Coal, soft (shale and con- cealed floor).....	0	7	2	7

Baileysville and Center Districts, Wyoming County.

No exposures either at prospects or outcrop were observed in the Little Eagle Coal in Baileysville and Center Districts, but it probably attains the same development here as in the area last described. Its areal extent therein is shown on Figure 16.

Slab Fork District, Wyoming County.

In Slab Fork District, the Little Eagle Coal has been mined locally by natives for domestic fuel. In its northern point, the following opening was examined by Gawthrop:

Coal Opening—No. 287 on Map II.

On south hillside of Trough Fork of Laurel, 0.5 mile southward from Skinned Poplar Gap; **Little Eagle Coal**; elevation, 2620' B.

			Ft.	In.
Shale, dark gray, silicious.....			10	0
Coal, soft, columnar.....	0'	11½"		
Shale, gray.....	0	1½		
Coal, medium soft.....	1	10		
Shale, gray.....	0	3		
Coal, medium soft.....	1	0	4	2

Shale, dark gray.....

Coal Prospect No. 288 on Map II, located ¼ mile south-east of that last described, on the opposite side of the ridge, at an elevation of 2600' B., as determined by the writer, had fallen shut in 1914, only 18 inches of the base of the bed being visible.

Sandy River District, McDowell County.

In Sandy River District, the Little Eagle Coal has not been prospected. As shown on Figure 16, its area is confined to several scattered patches in the northwest half. At **Pros-**

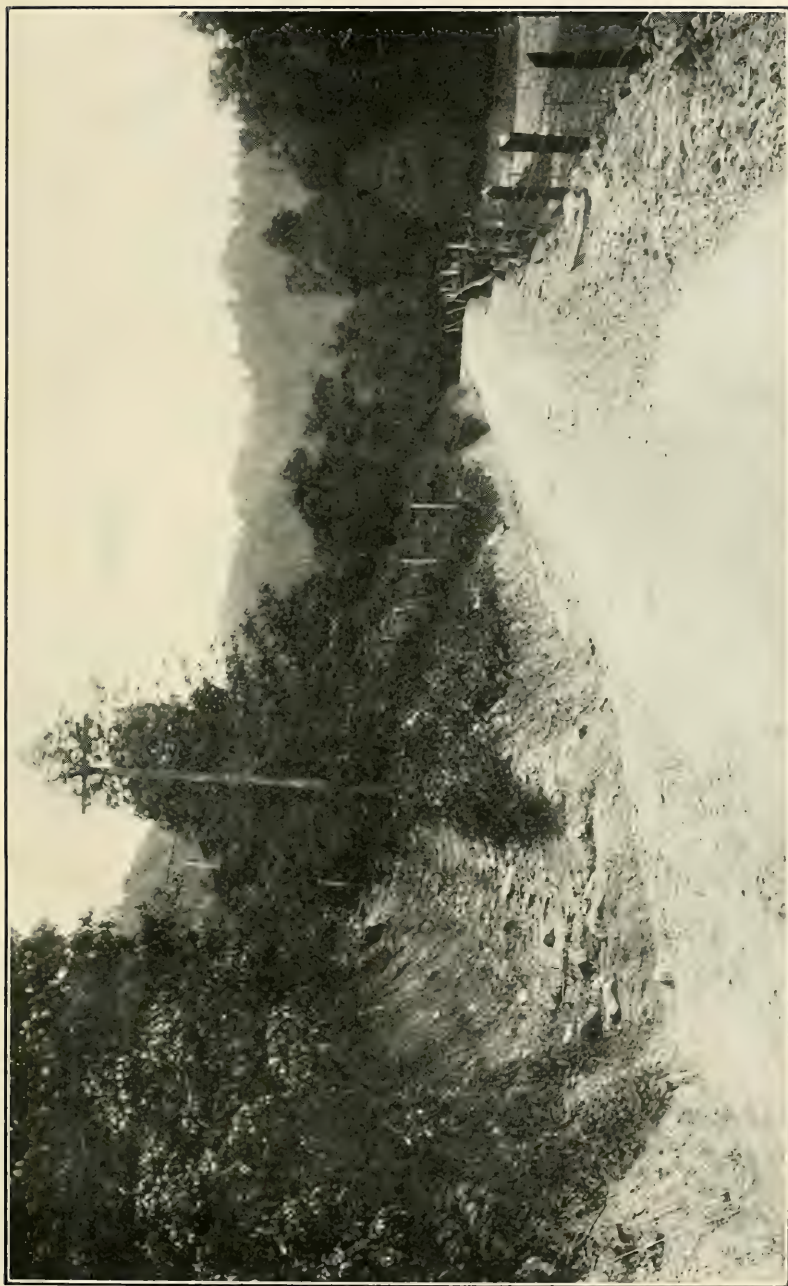
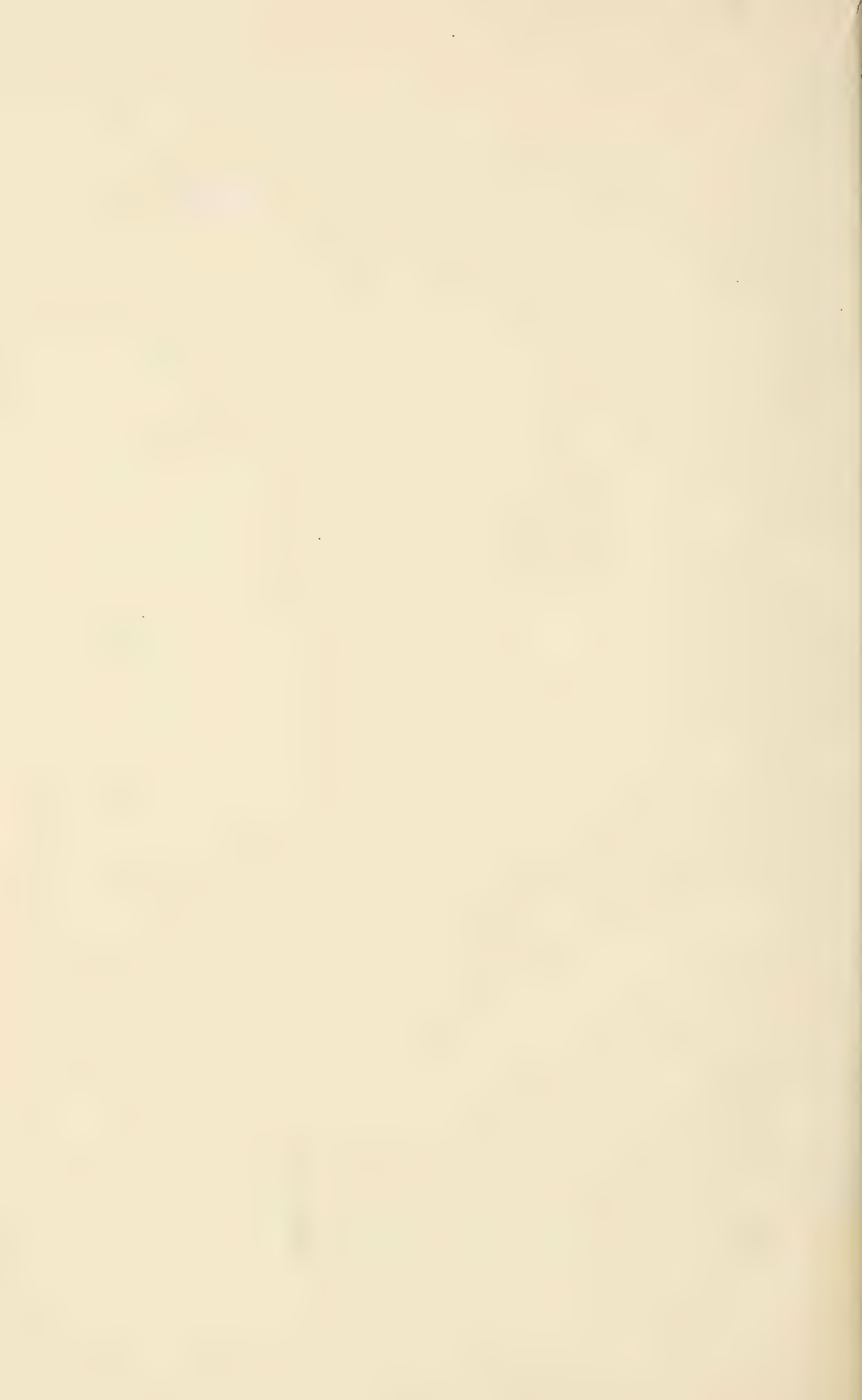


PLATE XX—Showing section of improved macadam road between Welch and Gary, constructed by prisoners, and road replaced at left margin.—Photo by courtesy of W. J. McClaren, Road Engineer, McDowell County.



pect No. 289 on Map II, located just across the State Line from the southwest edge of the District and $\frac{1}{4}$ mile southeast of Paynesville, its thickness and stratigraphic position are shown in the Paynesville Section, in Chapter V, under the description of the **Eagle Limestone**, page 161.

Quantity of Little Eagle Coal Available.

The following estimate is made for the amount of Little Eagle Coal available, based on the evidence in the preceding pages and an areal determination by interpolation by Gawthrop between that for the Eagle and Lower War Eagle beds, practically no coal having been mined:

Probable Amount of Little Eagle Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet Of Coal.	Short Tons of Coal.
Wyoming:					
Oceana.....	2.5	67.00	42,880	4,641,753,600	185,670,144
Clear Fork.....	2.5	28.00	17,920	1,951,488,000	78,059,520
Baileysville.....	2.5	4.00	2,560	278,784,000	11,151,360
Huff Creek.....	2.0	10.00	6,400	557,568,000	22,302,720
Slab Fork.....	2.5	3.00	1,920	209,088,000	8,363,520
Center.....	2.5	0.30	192	20,908,800	836,352
Totals.....		112.30	71,872	7,659,590,400	306,383,616
McDowell:					
Sandy River.....	2.5	27.00	17,280	1,881,792,000	75,271,680
Browns Creek...	2.5	0.20	128	13,939,200	557,568
Totals.....		27.20	17,408	1,895,731,200	75,829,248
Totals for Both Counties.		139.50	89,280	9,555,321,600	382,212,864

THE CEDAR COAL.

The Cedar Coal is described briefly in Chapter V, pages 157-8, where its correlation is suggested with a "split" off the Little Eagle bed proper of the Kanawha Valley. As a minable seam, it appears to be confined to Clear Fork, Baileysville and Huff Creek Districts (Wyoming); and Sandy River

and Browns Creek Districts (McDowell), as shown on Figure 28, along with that for the No. 3 Pocahontas Coal. Its outcrop is not given on Map II, but it belongs slightly over 100 feet below the Eagle bed, the crop of which is shown on the latter map.

Oceana, Center and Slab Fork Districts, Wyoming County.

The Cedar Coal does not appear to attain minable dimensions as a separate and distinct bed within the borders of Oceana, Center and Slab Fork Districts, although its horizon outcrops therein. The only exposure of this seam observed is that given on a preceding page of this Chapter under the description of **Prospects Nos. 256 and 257 on Map II.**

Clear Fork District, Wyoming County.

In Clear Fork District, the approximate minable area of the Cedar Coal appears to be confined mostly to that region lying south of the Guyandot River. In its northwest edge, the following opening was examined by Gawthrop:

Coal Opening—No. 289A on Map II.

On the east hillside of Sycamore Branch of Cub Creek, 0.6 mile north of Guyan P. O.; **Cedar Coal**; elevation, 1215' B.

		Ft.	In.
Shale, gray, silicious, plant fossils.....		5	0
Coal, soft.....	0' 5½"		
Slate, black.....	0 1		
Coal, harder.....	1 0½		
Coal, medium soft.....	7	2	2
<hr/>			
Shale and concealed.....			

No exposures of the Cedar Coal were observed in that portion of the District outlined on Figure 28 as its approximate minable area, but it is believed to be present in fair thickness in this region, judged from its character at the openings given below in the immediately adjoining Districts.

Baileysville District, Wyoming County.

In Baileysville District, the Cedar Coal appears to have developed into a separate and distinct minable bed. In the northwest portion, the following opening was examined by the writer:

W. A. Graham Coal Opening—No. 290 on Map II.

On head of the left branch of Spratt Branch of Clear Fork, 1.7 miles northwest of Baileysville; **Cedar Coal**; elevation, 1645' B.
Ft. In.

Slate, black.....				
Coal, soft.....	0'	2"		
Slate	0	0½		
Coal, soft.....	0	8		
Slate	0	0⅛		
Coal, soft (slate floor).....	2	6	3	4⅝

The above opening was closed so that a section by direct measurement could not be obtained, the figures being those furnished by W. A. Graham. Here it belongs about 150 feet below the Eagle bed at Opening No. 226 on Map II, ¼ mile northeastward.

Slightly less than one-half mile southeastward in the same District, Gawthrop examined the following opening in this bed:

Cole & Crane Coal Opening—No. 291 on Map II.

On head of Pigeon Branch, east edge of trail, 1.3 miles northwest of Baileysville; **Cedar Coal**; elevation, 1675' B.

			Ft.	In.
Shale, gray, silicious, visible.....			10	0
Coal, soft.....	0'	6"		
Coal, concealed, but reported 30".....	2	6	3	0

Mr. James St. Clair is authority for the thickness of the basal member in the section above.

Huff Creek District, Wyoming County.

In Huff Creek District, the Cedar Coal appears to cover a greater minable acreage than in all the others in Wyoming County combined, as shown on Figure 28. The following opening, in its western edge, was examined by Gawthrop:

Coal Opening—No. 292 on Map II.

In ravine on north hillside of Trace Fork of Little Cub Creek, 1.4 miles northwest of Botsford; **Cedar Coal**; elevation, 1380' B.

		Ft.	In.
Shale, gray, silicious.....		5	0
Coal, soft, columnar.....	0' 8"		
Shale, gray.....	0 1		
Coal, soft, columnar.....	0 11	Cedar.....	1 8
<hr/>			
Shale and unrecorded.....		93	0
Shale		3	0
Coal, Lower War Eagle (1280' B.).....		4	5

Here, the Cedar Coal belongs about 175 feet below the Eagle ("Middle War Eagle") bed.

Sandy River District, McDowell County.

In Sandy River District, the Cedar Coal probably attains its best development in either County. Figure 28 shows its approximate minable area confined to several scattered patches in the northwest half. The following prospect in the northern border was examined by the writer:

Alex. Collins Coal Prospect—No. 293 on Map II.

On south hillside of Panther Branch of Longpole Creek, 0.3 mile southward from Longpole P. O.; **Cedar Coal**; elevation, 1590' B.

	Ft.	In.
Concealed		
Sandstone, with shale layers.....	6	0
Coal, medium soft (not seen, reported by Mr. Collins), opening closed.....	2	0

The thickness and bed structure of the Cedar Coal three miles westward are given in the Mouth of Longpole Section, page 87.

Seven miles southeastward in the same District, **Crop**

Exposure No. 294 on Map II, in ridge road, 2.1 miles due south of Iaeger, is in the Cedar Coal. Only 14 inches of the bed was visible at this point at an elevation of 1900' B., 30 to 40 feet above the crop of the marine fossiliferous Eagle Shale.

Browns Creek District, McDowell County.

In Browns Creek District, no exposures of the Cedar Coal either at prospects or outcrop were observed, but it probably attains the same development as described on a preceding page for Huff Creek District.

Quantity of Cedar Coal Available.

Based on the evidence given on the preceding pages and the determination of its approximate minable area by Gawthrop as outlined on Figure 28, the following estimate is made for the probable amount of Cedar Coal in both Counties, no coal having been mined:

Probable Amount of Cedar Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet Of Coal.	Short Tons of Coal.
Wyoming:					
Clear Fork.....	2	2.0	1,280	111,513,600	4,460,544
Baileysville.....	2	1.5	960	83,635,200	3,345,408
Huff Creek.....	2	11.0	7,040	613,324,800	24,532,992
Totals.....	.....	14.5	9,280	808,473,600	32,338,944
McDowell:					
Sandy River.....	2	30.0	19,200	1,672,704,000	66,908,160
Browns Creek...	2	0.3	192	16,727,040	669,081
Totals.....	.....	30.3	19,392	1,689,431,040	67,577,241
Totals for Both Counties..		44.8	28,672	2,497,904,640	99,916,185

THE LOWER WAR EAGLE COAL.

The Lower War Eagle Coal, described in Chapter V, pages 162-3, is of secondary importance, ranging along with the Little Eagle, Glenalum Tunnel and Gilbert beds of the

Kanawha Group. It is known to be of minable dimensions in the northwest Districts of each County, its approximate minable area being shown on Figure 17. The latter also shows its northwest boundary line in Oceana District, where it has probably thinned below minable thickness—18 inches—the same agreeing for that determined for this bed in the immediately adjoining portion of Logan County by Hennen⁸ and

⁸Ray V. Hennen and D. B. Reger, Logan-Mingo Report, W. Va. G. S., p. 696; 1914.



Figure 17.—Showing Approximate Minal Area of the Lower War Eagle Coal (See Explanations in Author's Preface).

Reger. Its outcrop may be approximately determined in the region of its occurrence, as it belongs about 200 feet above Gilbert Coal, whose crop is outlined on Map II. There are no commercial mines on it in either County, although it has been mined and prospected considerably by natives for local domestic fuel.

Oceana District, Wyoming County.

In Oceana District, the Lower War Eagle Coal in minable thickness appears to be mostly confined to the waters of Clear Fork, or to the southeast of the summit of Huff Mountain. Within this boundary the 3 following openings were examined by the writer:

Coal Opening—No. 295 on Map II.

Four-tenths mile north of mouth of Cow Creek, and 1.2 miles northeast of Oceana; **Lower War Eagle Coal**; elevation, 1545' B.

	Ft.	In.
Concealed		
Sandstone, massive, Lower War Eagle	2	0
Coal, soft (slate floor).....	1	5

Coal Prospect—No. 296 on Map II.

On the south hillside of Clear Fork, 0.2 mile south of Crany P. O., and $\frac{3}{4}$ mile southeast of mouth of Crane Fork; **Lower War Eagle Coal**; elevation of 1955' B.

	Ft.	In.
Concealed		
Slate, black, fossil plants.....	8	0
Coal, soft.....2' 0"		
Coal, reported (slate floor)...0 8	2	8

Coal Prospect—No. 297 on Map II.

On south hillside of Clear Fork, 1.9 miles westward from Clear Fork Gap; **Lower War Eagle Coal**; elevation 2260' B.

	Ft.	In.
Concealed		
Slate, black, with plant fossils and iron ore nodules	7	0
Coal, soft.....1' 6"		
Slate, gray.....0 1		
Coal, soft (slate floor).....0 9	2	4

Slightly over two miles eastward, the thickness and bed structure of the Lower War Eagle Coal at a country bank on the east side of Guyandot Mountain in the edge of Raleigh County, just south of the public road, are given in the Clear Fork Gap Section in Chapter IV, pages 63-4.

At **Opening No. 298 on Map II**, located on the left fork of Bear Branch, 2 miles northeast of Oceana, and 0.5 mile northeast of Edith, Gawthrop reports this bed at an elevation of 1900' B. This digging had fallen shut, but the coal is reported 2 feet in thickness.

Clear Fork District, Wyoming County.

In Clear Fork District, the Lower War Eagle has been prospected and mined considerably by natives for local domestic fuel. The eight following openings, all on the waters of Cub Creek, were examined by Gawthrop:

Coal Opening—No. 299 on Map II.

In run on west side of Cub Creek, 0.4 mile southwest of mouth of Sturgeon Branch; **Lower War Eagle Coal**; elevation, 1140' B.

			Ft.	In.
Shale, dark, silicious.....			10	0
Coal, soft, columnar.....	1'	5"		
Shale, gray.....	0	1		
Coal, soft (shale floor).....	0	7	2	1

Coal Opening—No. 300 on Map II.

On west hillside of Cub Creek, 0.4 mile southwest of Hatfield Branch; **Lower War Eagle Coal**; elevation, 1150' B.

			Ft.	In.
Shale, gray, silicious.....				
Coal, medium soft, columnar..	1'	10"		
Shale, gray	0	1		
Coal, soft (shale floor).....	0	4	2	3

Coal Opening—No. 301 on Map II.

On east hillside of Cub Creek, opposite mouth of Sturgeon Branch;
Lower War Eagle Coal; elevation, 1160' B.

			Ft.	In.
Shale, gray, silicious.....				
Coal , soft, columnar.....	1'	5"		
Shale, gray.....	0	2		
Coal , soft, columnar (shale floor)	0	9	2	4

Coal Opening—No. 302 on Map II.

In run on east side of Cub Creek, 0.2 mile southeast of mouth of
 Hatfield Branch; **Lower War Eagle Coal**; elevation, 1175' B.

			Ft.	In.
Sandstone				
Shale, gray, silicious.....			1	0
Coal , medium soft.....	0'	3½"		
Sandstone, hard.....	0	10½		
Coal , medium soft (shale and concealed floor).....	1	1	2	3

Coal Opening—No. 303 on Map II.

On south hillside, 0.6 mile up Hatfield Branch of Cub Creek;
Lower War Eagle Coal; elevation, 1215' B.

			Ft.	In.
Sandstone, visible.....			1	0
Shale, gray, silicious, with iron ore nodules.....			5	0
Coal , medium soft (shale floor).....			2	0

Coal Exposure—No. 304 on Map II.

In Sycamore Branch of Cub Creek, 0.4 mile north of Guyan;
Lower War Eagle Coal; elevation, 1140' B.

			Ft.	In.
Sandstone, flaggy, and shale, dark.....			5	0
Coal , hard.....	0'	7½"		
Bone	0	1½		
Coal , hard.....	0	3	1	0
Shale and concealed to Branch.....			5	0

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Coal Opening—No. 305 on Map II.

At mouth of Mosby Branch of Cub Creek; **Lower War Eagle Coal**; elevation, 1165' B.

			Ft.	In.
Sandstone, massive.....				
Coal, soft.....	0'	2¾"		
Slate, 0" to.....	0	0¼		
Coal, medium soft.....	1	8	1	11
<hr/>				
Shale and concealed.....				

Coal Opening—No. 306 on Map II.

On north bank of Cub Creek, 0.6 mile southwest of Tantrough Hollow; **Lower War Eagle Coal**; elevation 1210' B.

		Ft.	In.
Sandstone			
Shale, gray.....		3	0
Coal, medium soft (shale floor).....		1	11

The two following openings were examined by the writer:

Coal Opening—No. 307 on Map II.

Three miles northwest of Baileysville and 0.2 mile northeast of mouth of Cedar Creek; **Lower War Eagle Coal**; elevation, 1515' B.

			Ft.	In.
Concealed				
Slate, bluish gray, sandy.....				
Coal, medium soft.....	2'	8½"		
Slate, gray, 0" to.....	0	0½		
Coal, soft (slate floor).....	1	1	3	10

Jos. P. Cook Coal Opening—No. 308 on Map II.

In run on north side of Clear Fork, 1 mile northwest of Ellick; **Lower War Eagle Coal**; elevation, 1455' B.

		Ft.	In.
Sandstone, massive, greenish gray, Lower War Eagle		30	0
Shale, buff, sandy.....		6	0
Coal (opening closed), reported by Mr. Cook.....		2	6
Concealed and flaggy sandstone.....		10	0

The three following openings in Clear Fork District were examined by Gawthrop:

Harmon Newberry Coal Opening—No. 309 on Map II.

On south hillside of Little Branch of Clear Fork, 1.8 miles north-east of Elklick; **Lower War Eagle Coal**; elevation, 1670' B.

		Ft.	In.
Sandstone, flaggy, and shaly.....		5	0
Shale, gray, silicious.....		10	0
Coal, medium soft.....	0' 10"		
Coal, soft, columnar.....	1 0½		
Sulphur streak, 0" to.....	0 0½		
Coal, soft, columnar (shale floor)	1 0	2	11

J. F. Belcher Coal Opening—No. 310 on Map II.

On north hillside of Elklick Branch of Clear Fork, 1.3 miles north-east of Elklick P. O.; **Lower War Eagle Coal**; elevation, 1730' B.

	Ft.	In.
Sandstone, flaggy, visible.....	3	0
Shale, gray, silicious.....	12	0
Coal, soft, columnar (shale floor).....	2	9

Coal Opening—No. 311 on Map II.

In run on south side of Elklick Branch of Clear Fork, 1.7 miles due east of Elklick P. O.; **Lower War Eagle Coal**; elevation, 1820' B.

		Ft.	In.
Concealed			
Shale, gray, with plant fossils.....		1	0
Coal, soft.....	0' 7"		
Shale, 0" to.....	0 0½		
Coal, harder.....	0 3		
Coal, soft, columnar (shale floor)	1 11	2	9½

Huff Creek District, Wyoming County.

In Huff Creek District, the Lower War Eagle Coal has been mined locally by natives for domestic fuel, the two following openings in the western border having been examined by Gawthrop:

Coal Opening—No. 312 on Map II.

In run on west side of Little Cub Creek, 0.6 mile southwest of mouth of Trace Fork, and 0.8 mile northwest of Botsford; **Lower War Eagle Coal**; elevation, 1290' B.

			Ft.	In.
Shale, gray and black, silicious.....			8	0
Coal, medium soft.....	3'	0"		
Coal, concealed by water, re- ported	1	0	4	0

Coal Opening—No. 313 on Map II.

On north hillside of Trace Fork of Little Cub Creek, 0.8 mile west of mouth of former; **Lower War Eagle Coal**; elevation 1280' B.

			Ft.	In.
Shale, visible.....			3	0
Coal	2'	3"		
Shale	0	2		
Coal	2	0	4	5

The above opening had fallen shut when visited by Gawthrop, the section being that furnished by a native.

The following opening, located about 2 miles southeastward in Clear Fork District, was examined by the writer:

Coal Opening—No. 314 on Map II.

One mile up Garden Gap Branch of Guyandot River $\frac{3}{4}$ mile northeast of Botsford; **Lower War Eagle Coal**; elevation, 1365' B.

			Ft.	In.
Concealed				
Sandstone, massive at top; flaggy at bottom....			7	0
Coal, soft.....	1'	5"		
Coal, harder (slate floor).....	1	9	3	2

The following opening in the southwest edge of the same District was examined by Gawthrop:

Coal Prospect—No. 315 on Map II.

On head of Muzzle Fork, $1\frac{1}{4}$ miles southeast of Botsford; **Lower War Eagle Coal**; elevation, 1455' B.

			Ft.	In.
Sandstone, shaly.....				
Coal, visible.....	1'	2"		
Concealed and shale.....	5	0	6	2
Sandstone, massive, visible, Upper Gilbert			10	0

Baileysville and Center Districts, Wyoming County.

In Baileysville and Center Districts, no exposures either at prospects or outcrop were observed on the Lower War Eagle Coal, but it is probably present in the regions indicated on Figure 17 in practically the same development as in the Districts described above for this bed.

Slab Fork District, Wyoming County.

In Slab Fork District, the Lower War Eagle Coal is confined to 4 or 5 scattered patches in the northwest half. A sample for analysis was collected from this bed and the following data obtained by the writer:

Coal Opening—No. 13 on Map II.

On head of the left fork of Tom Bailey Branch of Glen Fork, 1.2 miles south of Crany P. O.; **Lower War Eagle Coal**; elevation, 2165' B.

		Ft.	In.
Sandstone, flaggy and sandy.....		8	0
Coal, slaty.....0'	1"		
Slate, coaly.....0	1½		
Coal, soft.....0	3		
Slate, black, 0" to.....0	2		
Coal, medium soft (slate floor).3	5	4	0½

The composition of the sample from the lower bench only is published under No. 13 in the table of coal analyses at the end of this Chapter. The results show that it is a high grade fuel, very low in sulphur and comparatively low in ash.

Three-tenths mile eastward in the same District, the writer examined the following opening in this bed:

Coal Opening—No. 316 on Map II.

On head of the left fork of Tom Bailey Branch, 1¼ miles south of Crany P. O.; **Lower War Eagle Coal**; elevation, 2190' B.

		Ft.	In.
Slate			
Coal, soft.....0'	2"		
Slate, black.....0	1½		
Coal, soft (slate floor).....3	5	3	8½

Sandy River District, McDowell County.

In Sandy River District, the Lower War Eagle Coal has been prospected and mined by natives for local domestic fuel almost as extensively as in Wyoming County. Its thickness and bed structure at **Openings Nos. 317 and 318 on Map II** are published in the sections given in Chapter V for Head of Longpole and Longpole P. O.—North, pages 135-6 and 136, respectively.

The two following openings were examined by the writer :

Alex. Collins Coal Opening—No. 319 on Map II.

On south hillside of Panther Branch of Longpole Creek, 0.2 mile south of Longpole P. O.; **Lower War Eagle Coal**; elevation, 1430' B.

	Ft.	In.
Concealed and sandstone.....		
Coal, soft (slate floor).....	2	9

Coal Opening No. 320 on Map II.

On east hillside of War Branch of Tug Fork, $\frac{3}{4}$ mile southwest of County Line, and 1.4 miles southeast of Longpole P. O.; **Lower War Eagle Coal**; elevation, 1505' B.

	Ft.	In.
Concealed		
Sandstone, flaggy.....	8	0
Coal, soft.....0' $1\frac{1}{2}$ "		
Slate, dark, gray.....0 $1\frac{1}{2}$		
Coal, soft, columnar (gray slate floor).....2 4	2	7

In the same District, its thicknesses at **Openings Nos. 321 and 322 on Map II** are given in the sections in Chapter IV for Douglas Station and Panther, pages 90-1 and 88-9, respectively. The two following openings were examined by Gawthrop:

Coal Opening—No. 323 on Map II.

In run on south side of Greenbrier Fork of Panther Creek, 2.2 miles southwest of Panther; **Lower War Eagle Coal**; elevation, 1420' B.

	Ft.	In.
Concealed		
Shale, gray, silicious.....	5	0

		Ft.	In.
Coal, medium soft, columnar..	1' 6"		
Fire clay, soft.....	0 1		
Slate	0 3		
Coal, soft, columnar (shale floor)	1 2	3	0

Coal Opening—No. 324 on Map II.

On west hillside of Greenbrier Fork of Panther Creek; 0.5 mile southwest of Opening No. 323 on Map II above; **Lower War Eagle Coal**; elevation, 1415' B.

		Ft.	In.
Shale, gray, silicious.....		12	0
Coal, medium soft.....	0' 11"		
Shale, gray, hard.....	0 3		
Slate, black.....	0 3		
Coal, visible.....	0 6		
Coal, concealed by water, reported	1 1	3	0

The six following openings on this bed in Sandy River District were examined by the writer:

Coal Opening—No. 325 on Map II.

On branch of Road Fork of Bull Creek, 2.6 miles southwest of Panther, just west of low gap; **Lower War Eagle Coal**; elevation, 1360' B.

Coal, opening fallen shut, reported.....18 inches.

Wm. A. Estep Coal Opening—No. 326 on Map II.

On west hillside of Meathouse Fork of Panther, 0.8 mile due west of mouth of Birchlick Branch; **Lower War Eagle Coal**; elevation, 2040' B.

		Ft.	In.
Concealed			
Shale, buff, sandy, bad roof.....		10	0
Coal, medium soft.....	2' 9"		
Shale, gray.....	0 2		
Coal, (slate floor).....	0 1	3	0

When visited in 1914, the above opening had fallen shut, the section being that furnished by Riley Estep, a native.

Coal Opening—No. 327 on Map II.

On head of Elias Branch of Slaunch Fork of Panther, 1.7 miles due west of mouth of Whiteoak Branch; **Lower War Eagle Coal**; elevation, 1740' B.

	Ft.	In.
Shale, black, Eagle	20	0
Sandstone, platy, Lower War Eagle	23	0
Concealed	10	0
Slate, black, fossil plants.....	5	0
Coal , soft, (slate floor).....	1	8½

Coal Opening—No. 328 on Map II.

On west side of road, head of North Fork, 1.4 miles northeast of Paynesville; **Lower War Eagle**; elevation, 2250' B.

	Ft.	In.
Concealed		
Shale, buff.....	3	0
Shale, carbonaceous, plant fossils abundant....	3	0
Coal , visible.....0' 10"		
Concealed to shale floor of digging	2 0	2 10

In **Coal Digging No. 329 on Map II**, at Paynesville, the **Lower War Eagle Coal** is 24 inches in thickness, the residence of James Horn resting on this bed, the latter being authority for the dimensions given. Here, it belongs directly above the great Upper Gilbert Sandstone, at an elevation of 2200' B.

Crop Exposure No. 330 on Map II, located on the ridge road, 1.4 miles southeast of Paynesville, represents the **Lower War Eagle Coal**. Here, it is about 3 feet in thickness, at an elevation of 2430' B., as determined by the writer.

Browns Creek and Big Creek Districts, McDowell County.

In Browns Creek and Big Creek Districts, no exposures either at country banks or outcrop were observed in the **Lower War Eagle Coal**, but it is probably present in the localities designated for it on Figure 17 in practically the same development as in the District last described.

Quantity of Lower War Eagle Coal Available.

Based on the evidence above and a determination of the area by interpolation between that of the Little Eagle and the Glenalum Tunnel Coals by Gawthrop, the following estimate is made for the amount of Lower War Eagle Coal, practically no coal having been mined out:

Probable Amount of Lower War Eagle Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana	2	50.00	32,000	2,787,840,000	111,513,600
Clear Fork.....	2	34.00	21,760	1,895,731,200	75,829,248
Baileysville	2	7.50	4,800	418,176,000	16,727,040
Huff Creek.....	2	17.00	10,880	947,865,600	37,914,624
Slab Fork.....	2	5.00	3,200	278,784,000	11,151,360
Center	2	0.50	320	27,878,400	1,115,136
Totals.....	.....	114.00	72,960	6,356,275,200	254,251,008
McDowell:					
Sandy River....	2	45.00	28,800	2,509,056,000	100,362,240
Browns Creek..	2	0.40	256	22,302,720	892,108
Big Creek.....	2	0.20	128	11,151,360	446,054
Totals.....	.....	45.60	29,184	2,542,510,080	101,700,402
Totals for Both Counties.		159.60	102,144	8,898,785,280	355,951,410

THE GLENALUM TUNNEL COAL.

The Glenalum Tunnel Coal, described in Chapter V, pages 165-6, is of secondary importance, ranking along with the bed last described in thickness and character, and its approximate minable area being confined to practically the same portion of each County, as shown on Figure 18. The latter also shows its northwest boundary line in Oceana District, where it has probably thinned below minable thickness—18 inches—this boundary agreeing with that determined for the same bed in the immediately adjoining portion of Logan County by

Hennen⁹ and Reger. As it belongs only about 100 feet above the Gilbert Coal whose crop is outlined on Map II, that for the Glenalum Tunnel seam may be readily determined in the region of its occurrence. It has never been mined commercially in the State, but it has been opened by the natives of Wyoming and McDowell for local domestic fuel.

⁹Ray V. Hennen and D. B. Reger, Logan-Mingo Rpt., W. Va. Geol. Survey, p. 708; 1914.



Figure 18.—Showing Approximate Minable Area of the Glenalum Tunnel Coal (See explanations in Author's Preface).

Oceana District, Wyoming County.

In Oceana District, the Glenalum Tunnel Coal in minable thickness appears to be confined almost entirely to the south-east of the crest of Huff Mountain on the waters of Clear Fork, as shown on Figure 18. Here, it has been opened and prospected quite extensively by the natives. Its thickness and stratigraphic position at **Openings Nos. 331 and 332 on Map II**, located at the west edge of Oceana, and 1 mile southeast of the same place, are given in the sections in Chapter IV for Oceana and Oceana—1.3 Miles Southeast, pages 61 and 62, respectively. **Coal Opening No. 333 on Map II**, located on the east hillside of Dry Branch, 0.6 mile north of Oceana, had fallen shut when visited by the writer in 1914, but it is in the Glenalum Tunnel bed, at an elevation of 1380' B., its thickness being reported as 28 inches.

The two following openings in the same District were examined by the writer:

Coal Prospect—No. 334 on Map II.

Nine-tenths mile up Simmons Fork, on south bank, 2.5 miles east of Oceana; **Glenalum Tunnel Coal**; elevation, 1635' B.

	Ft.	In.
Concealed		
Shale, black, sandy.....	5	0
Coal , soft.....	1	4
Slate, black, and concealed, to bed of Simmons Fork	6	0

Coal Opening—No. 15 on Map II.

In run, 0.5 mile south about 30° E. of mouth of Adkin Branch of Clear Fork, 5 miles eastward from Oceana; **Glenalum Tunnel Coal**; elevation, 1770' B.

		Ft.	In.
1. Concealed			
2. Shale, buff, sandy.....		7	0
3. Coal , soft.....	0' 1½"		
4. Shale, gray, sandy.....	0 11½"		
5. Coal , soft (slate floor)....	2 3	3	4

The writer collected a sample for analysis from No. 5 in the section at the above opening, the composition of which is

published under **No. 15** in the table of coal analyses at the end of this Chapter. The results show this to be a high grade coal, very low in both ash and sulphur.

Gawthrop collected another sample for analysis and obtained the following data at an opening in this seam:

Elbert G. Cook Coal Opening—No. 14 on Map II.

On north hillside of Laurel Fork, 0.4 mile northwest of Jesse and 3.5 miles southeast of Oceana; **Glenalum Tunnel Coal**; elevation, 1775' B.

			Ft.	In.
Shale, dark gray, with thin layers of sandstone..			8	0
Coal, soft, columnar.....	0'	7"		
Coal, harder.....	0	8		
Coal, soft, columnar (shale floor)	1	1	2	4

The composition of the sample from the entire bed section was not determined owing to the failure of the Legislature to provide funds to continue the effective work of the Survey Laboratories.

The three following openings in the Glenalum Tunnel Coal, all in Oceana District, were examined by Gawthrop:

Mary A. Workman Coal Opening—No. 335 on Map II.

On east hillside of Elkins Branch, 1.2 miles southeast of Jesse and 0.7 mile north of Elkins Gap; **Glenalum Tunnel Coal**; elevation, 2100' B.

			Ft.	In.
Shale, silicious.....			5	0
Coal, soft, columnar.....	0'	3"		
Slate	0	1		
Coal, soft, columnar (shale floor)	2	3	2	7

Coal Opening—No. 336 on Map II.

On west hillside of Elkins Branch, near ridge summit, 0.5 mile due west of Elkins Gap; **Glenalum Tunnel Coal**; elevation, 2110' B.

			Ft.	In.
Sandstone, flaggy			5	0
Shale, sandy.....			5	0
Coal	0'	3"		
Slate	0	5		
Coal	2	2	2	10

The above opening had fallen shut when visited by Gawthrop, the section of the bed being furnished by a native.

Coal Prospect—No. 336A on Map II.

On northwest hillside of Laurel Fork, 2 miles northeast of Jesse and 0.4 miles west of mouth of John O Branch; **Glenalum Tunnel Coal**; elevation, 1900' B.

		Ft.	In.
Sandstone, massive, Upper Gilbert		8	0
Coal , soft.....	1' 3½"		
Shale, gray.....	1 0		
Coal , soft (shale floor).....	1 8½	4	0

Clear Fork District, Wyoming County.

In Clear Fork District, the Glenalum Tunnel Coal attains practically the same development as in the area last described, the two following openings in the eastern edge being examined by Gawthrop:

Sarah Hunt Coal Opening—No. 337 on Map II.

On north hillside of Elklick Branch of Clear Fork, 1.9 miles northeast of Elklick; **Glenalum Tunnel Coal**; elevation, 1695' B.

		Ft.	In.
Concealed			
Sandstone, shaly, visible.....		2	0
Coal , soft.....	1' 3"		
Bone, 0" to.....	0 1		
Coal , soft (shale floor).....	0 9	2	1

Coal Opening—No. 338 on Map II.

On north bank of Elklick Branch, 0.3 mile southeast of Opening No. 337 on Map II; **Glenalum Tunnel Coal**; elevation, 1715' B.

	Ft.	In.
Concealed		
Sandstone, massive, Upper Gilbert	15	0
Concealed, with shale.....	10	0
Coal (opening closed) reported (floor concealed).....	2	6

Baileysville District, Wyoming County.

In Baileysville District, the Glenalum Tunnel Coal has practically the same development as in Clear Fork, and it has been prospected and mined here by natives for local domestic fuel. The following opening was examined by the writer:

Coal Opening—No. 339 on Map II.

On head of Brickle Branch of Guyandot River, $1\frac{3}{4}$ miles northwest of Baileysville; **Glenalum Tunnel Coal**; elevation, 1450' B.

		Ft.	In.
Concealed			
Shale, dark gray, plant fossils abundant.....		4	0
Coal, soft.....	1' 7"		
Bone	0 0½		
Coal, soft.....	0 5		
Coal, bony.....	0 2		
Coal, soft (slate floor).....	0 10	3	0½

The following opening was examined by Gawthrop:

Claude Graham Coal Opening—No. 340 on Map II.

On north hillside of Schoolhouse Branch, 0.9 mile southeast of mouth of Laurel Branch, 1.8 miles north of Baileysville; **Glenalum Tunnel Coal**; elevation, 1655' B.

		Ft.	In.
Sandstone, massive, Upper Gilbert		10	0
Concealed		20	0
Shale, gray, silicious.....		5	0
Coal, soft, columnar.....	1' 8"		
Shale, gray.....	0 1		
Coal, soft, columnar (shale floor)	0 11	2	8

Coal Opening—No. 341 on Map II.

Three-tenths mile southwest of low gap on head of Shannon Mill Creek, $3\frac{3}{4}$ miles northeast of Baileysville; **Glenalum Tunnel Coal**; elevation, 1835' B.

		Ft.	In.
Shale, sandy, bluish gray, fossil plants, calamites		6	0
Coal, soft.....	0' 2"		
Slate, dark gray, $\frac{1}{4}$ " to.....	0 0½		
Coal, soft, columnar.....	1 6		
Slate, dark gray.....	0 2		
Coal, soft, columnar (slate floor)	1 4	3	2½

Huff Creek and Center Districts, Wyoming County.

In Huff Creek and Center Districts, no exposures of the Glenalum Tunnel Coal, either at prospects or outcrop were observed, but it probably attains the same development here as in the area last described, in the localities designated for it on Figure 18.

Slab Fork District, Wyoming County.

In Slab Fork District, the Glenalum Tunnel Coal is confined to three or four small areas in the northwest half as shown on Figure 18. The following opening in this region, examined by the writer, illustrates its frequent double-bedded character:

Coal Prospect—No. 342 on Map II.

On the head of Tom Bailey Branch, 1.1 miles southeast of Crany; **Glenalum Tunnel Coal**; elevation, Lower Bench, 2150' B.

						Ft.	In.
Concealed						5	0
Slate, black.....							
Coal, soft.....	0'	10"	} Upper Bench				
Slate, gray.....	0	1		3'	2"		
Coal, soft.....	2	3					
Shale, dark, sandy, flaggy.....				3	10	} 10	6
Coal, soft.....	0'	2"	} Lower Bench				
Coal, bony.....	0	3					
Shale, dark, sandy.....	1	0		3	6		
Coal, soft (slate floor)...	2	1					

The following opening was examined by Gawthrop:

Coal Opening—No. 343 on Map II.

On head of Milam Fork, 1 mile northeast of Polk Gap and 4¼ miles northwest of Maben; **Glenalum Tunnel Coal**; elevation, 2475' B.

						Ft.	In.
Concealed							
Sandstone, massive.....						10	0
Fire clay shale.....						1	0
Coal, soft, columnar.....	0'	8"					
Shale, dark.....	0	1					
Coal, soft, columnar (shale floor)	2	2				2	11

Sandy River District, McDowell County.

In Sandy River District, the Glenalum Tunnel Coal does not carry quite as high an average thickness as it does in Wyoming County, but it has been prospected and mined by natives to a considerable extent for local domestic fuel. The four following openings in it were examined by the writer:

Alex. Collins Coal Opening—No. 344 on Map II.

On south hillside of Panther Branch of Longpole, 0.1 mile southwest of Longpole P. O.; **Glenalum Tunnel Coal**; elevation, 1305' B.

	Ft.	In.
Sandstone	3	0
Coal , medium soft.....	1	6½
Sandstone	1	0

Coal Opening—No. 345 on Map II.

On north bank of Bull Creek, 1¼ miles southwest of mouth of Road Fork and 3.5 miles west of Panther; **Glenalum Tunnel Coal**; elevation, 1130' B.

	Ft.	In.
Sandstone, shaly.....	15	0
Coal , soft.....0' 2"		
Shale, dark gray, fossil plants abundant	3	0
Coal , medium soft.....1 6	4	8
Slate and concealed.....	5	0
Sandstone, massive, making cliff, Lower Gilbert ..		

Coal Opening—No. 346 on Map II.

In run on east side of Road Fork, 2.7 miles southwest of Panther; **Glenalum Tunnel Coal**; elevation, 1265' B.

	Ft.	In.
Shale, dark gray, plant fossils abundant.....	4	0
Coal , soft.....0' 6"		
Shale, gray, 0" to.....0 1		
Coal , soft (slate floor).....1 0	1	7

Coal Opening—No. 347 on Map II.

On north bank of branch of Road Fork of Bull Creek, 3.8 miles southwest of Panther; **Glenalum Tunnel Coal**; elevation, 1225' B.

	Ft.	In.
Concealed		
Shale, dark, sandy.....	4	0
Coal , soft (slate, black, floor).....	1	2

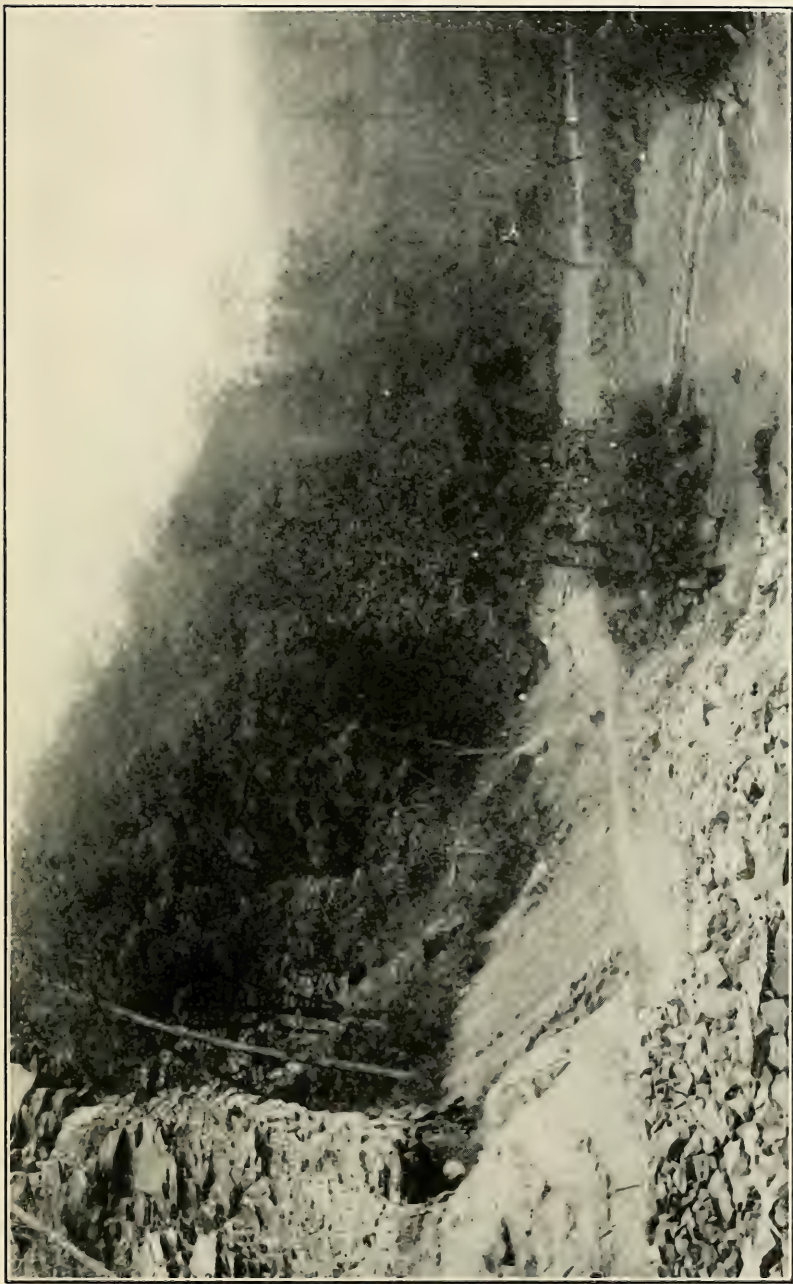


PLATE XXI—Showing improved highway along Elkhorn Creek, one mile west of Kimball, constructed by prisoners, and topography of the Pocahontas Group.—Photo by courtesy of W. J. McClaren,
(Road Engineer, McDowell County.)

The four following openings on this bed in the same District were examined by Gawthrop:

Coal Exposure—No. 348 on Map II.

In bed of Greenbrier Fork of Panther Creek, 2.6 miles southwest of Panther; **Glenalum Tunnel Coal**; elevation, 1300' B.

		Ft.	In.
Sandstone, massive, Upper Gilbert		15	0
Shale, gray.....		2	0
Coal , soft.....	0' 2"		
Shale, concealed, and sandstone	10 0		
Coal	1 0		
Coal , concealed by water, reported	1 8	12	10

Coal Opening—No. 349 on Map II.

On east hillside of Trap Fork of Panther, 2.8 miles southwest of Panther; **Glenalum Tunnel Coal**; elevation, 1350' B.

	Ft.	In.
Concealed		
Sandstone	2	0
Shale	2	0
Coal , medium soft.....	1	6
Shale and concealed to run.....	10	0

Coal Opening—No. 350 on Map II.

In bed of a left branch of Trap Fork, $\frac{3}{4}$ mile southwest of Opening No. 349 last given; **Glenalum Tunnel Coal**; elevation, 1430' B.

	Ft.	In.
Sandstone, massive.....		
Coal , medium soft.....	1	3
Shale and concealed to run.....	5	0

Coal Opening—No. 351 on Map II.

On head of Trace Fork of Panther, 2.2 miles southwest of mouth of Deerskin Branch; **Glenalum Tunnel Coal**; elevation, 1475' B.

		Ft.	In.
Concealed			
Shale, gray.....		15	0
Coal , medium soft.....	1' 0"		
Bone, 0" to.....	0 1		
Coal , medium soft.....	0 11		
Slate	0 1		
Coal , medium soft(slate floor).0	8	2	9

The six following openings in this bed, in the southern portion of Sandy River District, were examined by the writer:

Coal Opening—No. 352 on Map II.

On south hillside of a branch of Panther Creek, 4.3 miles southwest of Avondale and 1.1 miles northeast of mouth of Desolate Branch; **Glenalum Tunnel Coal**; elevation, 1920' B.

		Ft.	In.
Sandstone, massive, Upper Gilbert		75	0
Concealed		20	0
Shale, bluish gray.....		5	0
Coal , 1½" to.....	0' 2"		
Slate, gray.....	0 1		
Coal , soft.....	1 11		
Coal , slaty (slate floor).....	0 2	2	4

Coal Opening No. 353 on Map II.

On north edge of ridge road, 1.7 miles southwest of Beartown; **Glenalum Tunnel Coal**; elevation, 2100' B.

		Ft.	In.
Concealed			
Shale, buff, sandy and flaggy.....		8	0
Coal , soft.....	0' 1½"		
Shale and coal.....	0 4½		
Coal , soft (slate floor).....	1 8	2	2

Opening No. 354 on Map II, located on the south hillside of Meathouse Fork of Panther, 0.8 mile west of mouth of Birchlick Branch, at an elevation of 1935' B., is in the Glenalum Tunnel Coal, but had fallen shut. Here, according to Riley Estep—a native—it has a thickness of 28 to 30 inches.

Eli Kennedy Coal Opening—No. 355 on Map II.

Six-tenths mile southward from Opening No. 354 above and 0.8 mile southwest of Birchlick; **Glenalum Tunnel Coal**; elevation, 1955' B.

		Ft.	In.
Concealed			
Shale, flaggy, and sandy.....		10	0
Coal	0' 1½"		
Shale, gray, coaly	0 2		
Coal	0 1½		
Shale, gray, ½" to.....	0 1		
Coal , medium soft (slate floor).....	1 7	2	1

Opening No. 356 on Map II, located 0.4 mile south of No. 355, one mile northwest of mouth of Vance Fork, had fallen shut, but it is in the Glenalum Tunnel bed, and the coal is reported 28 to 30 inches in thickness. It comes at an elevation of 1955' B.

Coal Opening No. 357 on Map II, located on the north hillside of Oozley Branch, 1.8 miles southwest of Beartown, and the same distance northwest of Bradshaw, at an elevation of 2170' B., is in the Glenalum Tunnel bed. It had fallen shut, but the coal is reported slaty and 27 inches in thickness by J. F. Roberts.

The following opening was examined by Gawthrop:

Coal Opening—No. 358 on Map II.

On head of North Fork of Slaunch, 1.6 miles northeast of Paynesville; **Glenalum Tunnel Coal**; elevation, 2025' B.

		Ft.	In.
Concealed			
Sandstone, massive		3	0
Slate and shale with coal streaks	1' 6"		
Coal	0 3		
Shale	0 2		
Coal	0 4		
Slate	0 1		
Coal (shale and concealed floor)	0 4	2	8

In the extreme southern point of Sandy River District, the two following openings were examined by the writer:

Coal Prospect No. 359 on Map II, located just across the State Line in the edge of Virginia, near the residence of J. W. Day at Height P. O., at an elevation of 2775' B., is in the Glenalum Tunnel seam. The coal was concealed by debris, but it is reported by N. B. Day to have a thickness of 32 inches without partings.

Coal Opening—No. 360 on Map II.

On head of Hite Fork of Bradshaw Creek, 0.1 mile southwest of Peapatch (formerly Height P. O.); **Glenalum Tunnel Coal**; elevation, 2830' B.

		Ft.	In.
Sandstone, Upper Gilbert			
Coal, soft, visible	2' 0"		
Coal, concealed by water, reported (slate floor)	1 6	3	6

Browns Creek and Big Creek Districts, McDowell County.

In Browns Creek and Big Creek Districts, the Glenalum Tunnel Coal is confined to small patches on the northwest border as shown on Figure 18, but no exposures either at prospects or outcrop were observed, but it is believed to have practically the same development here as described for Sandy River and Huff Creek Districts on the foregoing pages.

Quantity of Glenalum Tunnel Coal Available.

Based on the evidence above and a determination by Gawthrop of the area by interpolation between that of the Lower War Eagle and Gilbert beds, the following estimate is made for the amount of Glenalum Tunnel Coal, practically no coal having been mined out:

Probable Amount of Glenalum Tunnel Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana	2	55.00	35,200	3,066,624,000	122,664,960
Clear Fork....	2	40.00	25,600	2,230,272,000	89,210,880
Baileysville ...	2	10.00	6,400	557,568,000	22,302,720
Huff Creek.....	2	24.00	15,360	1,338,163,200	53,526,528
Slab Fork.....	2	8.00	5,120	446,054,400	17,842,176
Center.....	2	0.70	448	39,029,760	1,561,190
Totals.....	.....	137.70	88,128	7,677,711,360	307,108,454
McDowell:					
Sandy River...	2	62.00	39,680	3,456,921,600	138,276,864
Browns Creek.	2	0.60	384	33,454,080	1,338,163
Big Creek.....	2	0.40	256	22,302,720	892,108
Totals.....	.....	63.00	40,320	3,512,678,400	140,507,135
Totals for Both Counties		200.70	128,448	11,190,389,760	447,615,589

THE GILBERT COAL.

The Gilbert Coal, described in Chapter V, page 168, is of secondary importance, ranking along with the Glenalum Tunnel and Lower War Eagle beds in thickness and character,

and, as shown on Figure 19, is confined to practically the same regions. Its approximate northwest boundary line, west of which it has thinned below minable dimensions—18 inches—is outlined on the same Figure, and its detailed crop is shown on Map II. It has never been mined commercially in the State, but in Wyoming and McDowell, this seam has been opened and prospected by natives and large land holding companies for local domestic fuel. Its bed-structure and character at these diggings will now be described by magisterial districts.

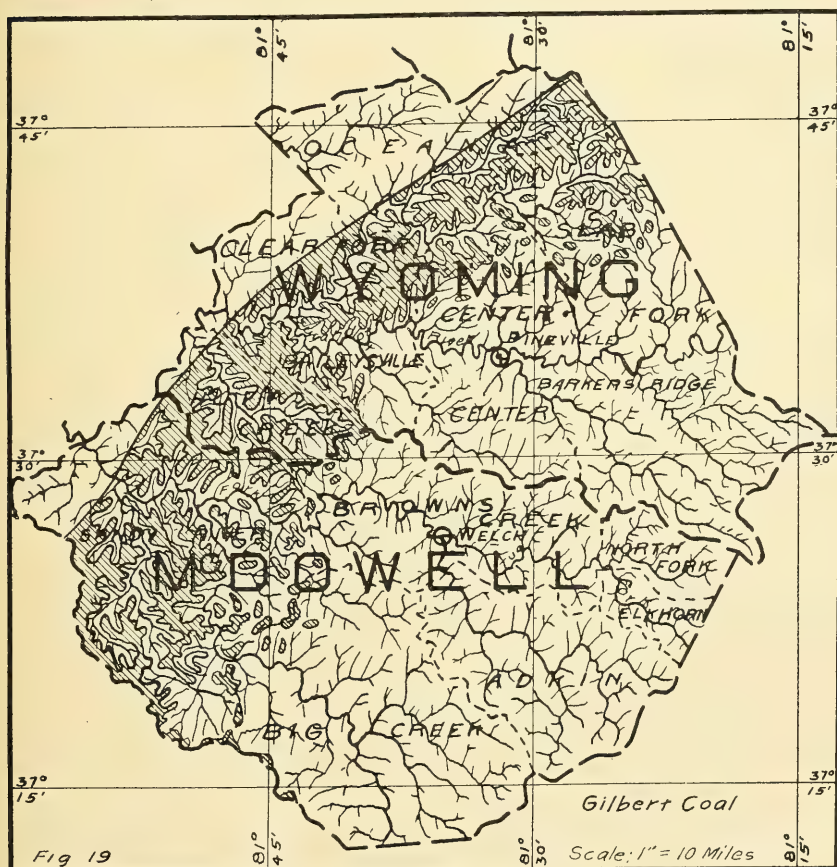


Figure 19.—Showing Approximate Minal Area of the Gilbert Coal
(See Explanations in Author's Preface).

Oceana District, Wyoming County.

In Oceana District, the Gilbert Coal, as a minable bed, appears to be confined to the waters of Clear Fork, where several country banks have been opened for local domestic fuel. The following crop exposure was examined by the writer:

Coal Exposure—No. 361 on Map II.

On the north bank of Clear Fork and road, 1 mile southwest of Oceana; **Gilbert Coal**; elevation, 1235' B.

	Ft.	In.
Sandstone, Lower Gilbert , making great cliff.....	50	0
Concealed	20	0
Sandstone, shaly.....	6	0
Coal , soft.....0' 3"		
Shale, bluish gray, sandy.....3 10		
Coal , soft.....1 0		
Slate, black.....0 2		
Coal , harder.....0 5	5	8
Shale and sandstone, and shale.....	4	3
Sandstone, Nuttall , to bed of Clear Fork.....	8	0

Its thickness and bed section at **Opening No. 362 on Map II**, on the west hillside of Laurel Fork, 1.1 miles northwest of Edith, are shown in the Oceana—1.3 Miles Southeast Section, published in Chapter IV. page 62. The three following openings in the same District were examined by the writer:

Coal Opening—No. 363 on Map II.

On west hillside of Laurel Fork, less than 300 yards southeast of Opening No. 362; **Gilbert Coal**; elevation, 1450' B.

	Ft.	In.
Concealed and shale.....		
Coal , soft.....0' 5"		
Shale, sandy, bluish.....8 0		
Coal , medium soft, columnar...1 11		
Bone, hard.....0 2		
Coal , soft (slate floor).....1 1	11	7

Cole & Crane Coal Opening—No. 364 on Map II.

On head of Coon Branch of Laurel, 2 miles southwest of Jesse and 1.7 miles west of Elkins Gap; **Gilbert Coal**; elevation, 1830' B.

		Ft.	In.
Concealed and shale, dark, sandy.....			
Coal, medium soft.....	0' 10 "		
Sulphur band.....	0 0 $\frac{1}{8}$		
Coal, soft (shale floor).....	1 6	2	4 $\frac{1}{8}$

Coal from this opening has an excellent reputation locally for burning in grates and cook-stoves.

Coal Opening—No. 365 on Map II.

On north bank of Clear Fork in northeast corner of Oceana District, 0.5 mile west of Knob Fork School House; **Gilbert Coal**; elevation, 1900' B.

		Ft.	In.
Concealed			
Shale, Gilbert , black, with marine fossils.....		6	0
Coal, soft.....	0' 7"		
Slate, gray.....	0 1		
Coal, soft.....	2 6	3	2
Slate, concealed and sandstone to bed of Clear Fork.....		50	0

A sample for analysis was collected and the following data obtained by the writer at an opening in this bed:

M. E. Gunnoe Coal Opening—No. 16 on Map II.

On west bank of Knob Fork, 0.4 mile northeast of Opening No. 365 last described; **Gilbert Coal**; elevation, 1940' B.

		Ft.	In.
1. Shale, black, marine fossils, Gilbert		7	0
2. Coal, soft.....	0' 7 "		
3. Slate, gray.....	0 0 $\frac{1}{4}$		
4. Coal	0 1		
5. Slate, gray.....	0 0 $\frac{1}{4}$		
6. Coal, soft (slate floor)....	2 2	2	10 $\frac{1}{2}$

The composition of the sample from Nos. 2 and 6 only of section is published under **No. 16** in the table of coal analyses at the end of this Chapter. Farther up Clear Fork, the two following openings were examined by the writer:

Coal Opening No. 366 on Map II, located on south hillside of Clear Fork, 0.5 mile southeast of Knob Fork School House, at an elevation of 2060' B., is in the Gilbert bed. The digging was closed, but the coal is reported to have about the same thickness as at the openings last described. Its black roof shale—Gilbert—carries the same marine fossils as seen at Opening No. 365.

Coal Opening—No. 367 on Map II.

On south hillside of Clear Fork, 1.4 miles westward from Clear Fork Gap; **Gilbert Coal**; elevation, 2155' B.

		Ft.	In.
Concealed			
Slate, black.....		6	0
Coal, soft.....	0' 6"		
Slate, dark gray.....	0 2		
Coal, soft (concealed floor)....	1 1	1	9

Clear Fork District, Wyoming County.

In Clear Fork District, the Gilbert Coal in minable thickness is confined to the waters of Guyandot River above the mouth of Cub Creek, as shown on Figure 19. Here, it has also been mined by the natives for local domestic fuel. The two following openings on it in the southern point of this District were examined by the writer:

Coal Opening—No. 368 on Map II.

On south hillside of Big Branch, 1.3 miles southwest of Lincoln and 5 miles west of Baileysville; **Gilbert Coal**; elevation, 1260' B.

		Ft.	In.
Concealed			
Coal blossom, Gilbert "A".....		0	0
Shale, sandy.....		2	0
Coal, soft.....	0' 8 "		
Slate, dark gray.....	0 2		
Coal, soft.....	0 9		
Bone	0 2½		
Coal, soft.....	1 0½	2	10
Slate, dark.....		1	3

Coal Opening No. 369 on Map II, located on west hillside of Big Branch, 0.6 mile northwest of No. 368 last described, at

an elevation of 1230' B., had fallen shut when visited by the writer, but it carries a "rider" coal similar to the latter opening, 5 to 6 feet above the main bench.

A sample for analysis was collected by Gawthrop and the following data obtained at an opening in this coal:

A. R. Wittenberg Coal Opening—No. 17 on Map II.

On east hillside of Reedy Branch, 0.5 mile northeast of Uno and 3 miles west of Ellick; **Gilbert Coal**; elevation, 1235' B.

		Ft.	In.
1.	Concealed		
2.	Shale, dark.....	20	0
3.	Coal, soft, 5" to.....	0' 9 "	
4.	Shale, gray.....	0 6	
5.	Coal, soft.....	0 3	
6.	Shale, gray.....	1 3	
7.	Coal, harder.....	0 7	
8.	Shale, gray.....	0 1	
9.	Coal, medium soft.....	0 6	
10.	Coal, soft, columnar.....	1 6	
11.	Slate	0 0½	
12.	Coal, bony.....	0 3½	
13.	Coal, medium soft.....	5	6 2

The composition of the sample from Nos. 7, 9 and 10 only of section are published under **No. 17** in the table of analyses at the end of this Chapter. The two following openings on the same stream were examined by Gawthrop:

A. S. Harvey Coal Opening—No. 370 on Map II.

On west side of Reedy Branch, just northwest of Uno, and 0.5 mile southwest of Opening No. 17; **Gilbert Coal**; elevation, 1215' B.

		Ft.	In.
	Concealed, with sandstone.....		
	Coal, soft.....	0' 2"	
	Shale, gray.....	3 6	
	Coal, soft.....	0 7	
	Shale, gray, 0" to.....	0 3	
	Coal, soft, visible.....	1 6	6 0
	Concealed by water.....		

Toler Heirs Coal Opening—No. 371 on Map II.

On east side of Reedy Branch, 0.15 mile due south of Uno; **Gilbert Coal**; elevation, 1235' B.

			Ft.	In.
Concealed, with shale.....				
Coal, soft.....	0'	2 "		
Shale, gray.....	2	6		
Coal, soft, columnar.....	0	7		
Shale, gray, 0" to.....	0	3		
Coal, soft.....	2	1¼		
Slate, black.....	0	0¼		
Coal, soft (shale floor).....	0	8	6	3½

The four following openings, in the southeast border of Clear Fork District, were examined by the writer:

Crop Exposure—No. 372 on Map II.

On north hillside of Guyandot River in road, 0.5 mile northwest of Simon; **Gilbert Coal**; elevation, 1235' B.

			Ft.	In.
Shale				
Coal, soft.....	0'	4"		
Shale and sandstone.....	7	0		
Coal, soft (shale floor).....	1	3	8	7

Coal Opening—No. 373 on Map II.

In ravine on north side of Clear Fork, 0.3 mile due east of Simon, and 0.3 mile northeast of Clear Fork; **Gilbert Coal**; elevation, 1250' B.

			Ft.	In.
Concealed				
Shale, dark, sandy.....			5	0
Coal, soft.....	0'	2½"		
Slate, gray.....	0	0½		
Coal, soft.....	0	5		
Fire clay, hard.....	0	10		
Coal, soft.....	1	0		
Bone	0	1		
Coal, soft (slate floor).....	1	0	3	7

Coal Opening—No. 374 on Map II.

On northwest hillside of Clear Fork, 0.2 mile southwest of mouth of Walls Branch and 3 miles northwest of Baileysville; **Gilbert Coal**; elevation, 1280' B.

		Ft.	In.
Concealed			
Shale, buff, sandy.....		7	0

			Ft.	In.
Coal, soft.....	0'	3 "		
Slate, gray.....	0	0 $\frac{1}{8}$		
Coal, soft.....	0	4		
Slate, gray.....	0	0 $\frac{1}{4}$		
Coal, soft (floor concealed)...	1	5	2	0 $\frac{3}{8}$

Coal Opening—No. 375 on Map II.

On east hillside of Walls Branch, 0.7 mile northward from Opening No. 374 last described; **Gilbert Coal**; elevation, 1255' B.

	Ft.	In.
Concealed		
Shale, buff, argillaceous.....	8	0
Slate, black, Gilbert , with marine fossils abundant	2	0
Coal, soft, 15" to.....	2	2
Slate, gray, and concealed.....		

Baileysville District, Wyoming County.

In Baileysville District, the Gilbert Coal has not been prospected quite so extensively as in those last described, the following, in the extreme northern point of the District, examined by the writer, being the only opening observed:

	Ft.	In.
Concealed		
Shale, dark.....	2	0
Coal, soft, columnar (1735' B.) (slate floor).....	2	11

The above opening comes 100 feet below another—No. 341 on Map II—in the Glenalum Tunnel Coal.

Huff Creek District, Wyoming County.

In Huff Creek District, the Gilbert Coal has been opened at several country banks by natives for local domestic fuel, the following digging, located in the western margin, being examined by the writer:

Coal Opening—No. 377 on Map II.

On the west bank of Little Cub Creek, 0.7 mile northwest of Botsford; **Gilbert Coal**; elevation, 1115' B.

	Ft.	In.
Concealed		
Shale, sandy.....	0	6

Coal, soft.....	0'	3½"	Ft.	In.
Slate, gray.....	0	1		
Coal, soft.....	0	4		
Slate.....	0	1		
Coal.....	0	1		
Slate.....	0	1		
Coal, soft.....	0	5		
Slate, black.....	0	0½		
Coal, soft.....	1	9	3	2

Concealed by water.....

The following opening on the waters of the same stream was examined by Gawthrop:

Coal Opening—No. 378 on Map II.

On the south bank of Trace Fork, 0.3 mile north of Opening No. 377 last described; **Gilbert Coal**; elevation, 1115' B.

			Ft.	In.
Concealed				
Shale, gray, silicious.....			5	0
Coal, gas, columnar.....	0'	5 "		
Slate, black.....	0	1½		
Coal.....	0	2		
Slate, black.....	0	2½		
Coal, gas, columnar.....	0	5		
Slate, black.....	0	1		
Coal, hard.....	1	6	2	11
Concealed, by water, and shale.....			5	0
Sandstone, massive.....				

The two following openings on the main branch of Little Huff Creek were examined by the writer:

Coal Opening—No. 18 on Map II.

On south hillside of Little Huff Creek, 0.4 mile west of Hanover; **Gilbert Coal**; elevation, 1160' B.

			Ft.	In.
1. Concealed				
2. Shale, flaggy, dark.....			4	0
3. Coal, soft.....	0'	7 "		
4. Slate, coaly.....	0	0½		
5. Coal, soft.....	0	4½		
6. Slate, black.....	0	0½		
7. Coal, soft.....	0	2		
8. Slate, dark gray.....	0	2		
9. Coal, soft.....	0	2½		
10. Coal, bony.....	0	1		
11. Coal, medium soft.....	1	6	3	2

	Ft.	In.
12. Slate and concealed.....	10	0
13. Sandstone, Nuttall (Dotson").....	50	0
14. Concealed to bed of Little Huff Creek.....	35	0

A sample for analysis was collected from Nos. 3, 5, 7 and 11 at the above opening, the composition of which is published under No. 18 in the table of coal analyses at the end of this Chapter.

Coal Opening—No. 379 on Map II.

On north hillside of Little Huff Creek, 0.4 mile northeast of Opening No. 18 last described; **Gilbert Coal**; elevation, 1155' B.

		Ft.	In.
Concealed and shale.....			
Coal, soft.....0'	1 "		
Slate, dark.....0	1¼		
Coal, soft.....0	1		
Slate, dark.....0	1¼		
Coal, soft.....0	9½		
Shale, gray.....0	0¾		
Coal, soft.....0	2¾		
Shale, gray.....0	2½		
Coal, soft.....0	2		
Slate, with coal streaks.....0	5		
Coal, soft (slate floor).....1	10	4	1

The following opening was examined by Gawthrop:

Cole & Crane Coal Opening—No. 380 on Map II.

On south hillside of Rose Branch of Little Huff Creek, 0.8 mile east of Hanover; **Gilbert Coal**; elevation, 1220' B.

		Ft.	In.
Shale, gray, silicious.....			
Coal, soft.....0'	1 "		
Slate, gray.....0	1		
Coal, soft.....0	5½		
Slate.....0	0¼		
Coal, soft.....0	3		
Shale, gray.....0	2½		
Coal, soft.....0	2		
Shale, gray.....0	2		
Coal, soft.....0	7		
Shale.....0	1		
Coal, soft.....1	8		
Coal, soft, concealed by water, reported (slate floor).....0	10	4	7¼

According to Gawthrop, the same bed has been opened on the opposite side of Rose Branch from Opening No. 380 last described, by **Amos Lester**, at an elevation 10 feet higher, where the coal has practically the same bed-section. The following opening on the waters of Little Huff Creek was examined by the writer:

Coal Opening—No. 381 on Map II.

On south hillside and 0.3 mile up Gardengap Branch, and 0.9 mile southwest of Hanover; **Gilbert Coal**; elevation, 1165' B.

			Ft.	In.
Concealed				
Shale, buff, sandy.....			5	0
Coal, soft.....0'	7½"			
Slate, gray, dark.....0	1½			
Coal, soft.....0	3			
Slate	0 0⅛			
Coal, soft.....0	2			
Slate, gray.....0	1			
Coal, medium soft, good (slate floor).....3	5	.....	4	8⅛

The following opening was examined by Gawthrop in the same District:

Coal Opening—No. 382 on Map II.

On south hillside 0.2 mile up Nelson Branch of Little Huff Creek and 0.7 mile southward from Hanover; **Gilbert Coal**; elevation, 1205' B

			Ft.	In.
Sandstone, flaggy and shaly.....				
Coal, soft.....0'	4 "			
Slate	0 0¼			
Coal, soft.....0	4			
Slate	0 0¼			
Coal, soft.....0	2½			
Shale, gray.....0	0½			
Coal, soft.....0	4½			
Shale, gray.....0	1			
Coal, soft, visible.....1	8	.....	3	1

Concealed by water.....

The two following openings, on the waters of Muzzle Fork in the same District, were examined by the writer:

Coal Opening—No. 383 on Map II.

On south hillside, 0.3 mile up Muzzle Fork and 1.7 miles southward from Hanover; **Gilbert Coal**; elevation, 1280' B.

			Ft.	In.
Concealed				
Shale, sandy, flaggy.....				
Coal, soft.....	0'	0½"		
Sandstone	0	3		
Coal, slaty.....	0	3		
Coal, soft.....	0	9		
Slate, gray.....	0	1½		
Coal, soft.....	0	1		
Slate, gray.....	0	0½		
Coal, soft.....	1	7		
Bone	0	1		
Coal, soft.....	1	6	4	8½
Slate and concealed.....			1	0
Sandstone, massive, Nuttall (" Dotson ").....			30	0
Concealed				

Lasher Coal Opening—No. 384 on Map II.

In a ravine on east hillside of Left Fork of Muzzle, 0.6 mile southward from Opening No. 383 last described; **Gilbert Coal**; elevation, 1340' B.

			Ft.	In.
Concealed				
Shale, dark, sandy.....			5	0
Coal, slaty.....	0'	2 "		
Coal, soft.....	0	10		
Slate, gray.....	0	0¼		
Coal	0	1		
Slate, gray.....	0	0¼		
Coal, soft (slate floor).....	2	2½	3	4

Coal Opening No. 385 on Map II, examined by Gawthrop and located on the south hillside of Muzzle Fork, 0.6 mile northwest of the opening last described, at an elevation of 1270' B., is in the **Gilbert bed**. The digging had fallen shut, so that a section of the seam could not be obtained. The two following openings, in the southern edge of Huff Creek District, were examined by the writer:

Coal Opening—No. 386 on Map II.

In ravine on east hillside of Left Fork of Muzzle, 0.2 mile southeast of mouth of Rock Branch; **Gilbert Coal**; elevation, 1350' B.

			Ft.	In.
Concealed				
Shale, dark, plant fossils abundant.....			0	4
Coal, soft.....	0'	6 "		
Shale, dark gray, plant fossils abundant.....	2	0		
Coal, soft.....	0	2½		
Slate, gray, ¼" to.....	0	0½		
Coal, soft.....	0	0½		
Slate, black.....	0	0¼		
Coal, soft, columnar (slate floor).....	2	3	5	0¾

Coal Opening—No. 387 on Map II.

On west bank of Left Fork of Muzzle, 0.5 mile southward from mouth of Rock Branch; **Gilbert Coal**; elevation, 1340' B.

			Ft.	In.
Sandstone			2	0
Shale, buff, fossil plants abundant.....			5	0
Shale, dark, fossil plants—ferns and calamites—abundant.....			1	0
Coal, soft.....	0'	2 "		
Slate, dark gray.....	0	0½		
Coal, soft.....	0	3		
Slate, gray.....	0	0⅝		
Coal, soft (slate floor).....	2	3	2	8⅝

In the southern portion of the same District, the following opening was examined by Gawthrop:

Coal Opening—No. 388 on Map II.

In drain on west side of Buffalo Creek, tributary to Little Huff, 1.4 miles southwest of mouth of Suke Creek; **Gilbert Coal**; elevation, 1400' B.

			Ft.	In.
Shale, gray, silicious.....			6	0
Coal, soft.....	0'	3 "		
Slate	0	0½		
Coal, soft.....	0	5½		
Shale, gray.....	0	1		
Coal, soft.....	0	2		
Slate	0	0½		
Coal, soft.....	0	3		
Slate, 0" to.....	0	0½		
Coal, medium soft.....	2	9	4	1

Slab Fork District, Wyoming County.

In Slab Fork District, the Gilbert Coal is confined to several scattered patches high up in the hills and ridges in the northwest half, the following opening in it, examined by Gawthrop, being the only exposure of this seam observed in this District:

Coal Opening—No. 389 on Map II.

On head of a north branch of Milam Fork, 1.4 miles S. 75° E. of McGraw; **Gilbert Coal**; elevation, 2340' B.

		Ft.	In.
Concealed and flaggy sandstone.....			
Coal, soft.....0'	1 "		
Shale, gray.....0	2½		
Coal, soft, columnar.....0	9		
Coal, hard, bony.....0	3½		
Coal, soft, columnar.....1	3	2	7
<hr/>			
Slate and concealed.....			

The above is a somewhat isolated opening, but the correlation given appears to be corroborated both by its bed-section and its interval—725 to 750 feet—above the Sewell Coal, as determined from the contours of the latter bed on Map II.

Center District, Wyoming County.

In Center, the Gilbert Coal is confined to a few scattered patches along the north margin of the District, the two following country banks in this region being examined by Gawthrop:

Coal Opening—No. 390 on Map II.

On east hillside, 0.9 mile up Laurel Fork of Turkey Creek, and 1.7 miles southward from Jesse; **Gilbert Coal**; elevation, 1775' B.

		Ft.	In.
Sandstone, shaly.....			
Coal, medium soft.....2'	0"		
Coal, concealed, but reported by			
A. M. Cook.....1	0	3	0
<hr/>			

Coal Opening—No. 391 on Map II.

Seven-tenths mile due north of mouth of Bee Fork of Turkey Creek, and 0.6 mile west of Turkey; **Gilbert Coal**; elevation, 1820' B.

		Ft.	In.
Shale, dark gray, visible.....		5	0
Coal, soft, visible.....	2' 0"		
Coal, concealed, but reported by			
A. M. Cook.....	0 10	2	10

The following digging was examined by the writer:

Coal Opening—No. 392 on Map II.

On head of Turkey Creek, 200 yards east of road summit, low gap, head of Coon Branch of Laurel; **Gilbert Coal**; elevation, 1890' B.

		Ft.	In.
Sandstone, massive, great cliff, Lower Gilbert		40	0
Concealed		15	0
Shale, dark, sandy.....		10	0
Coal, medium soft.....	0' 2"		
Coal, soft, columnar (slate floor).....	2 5	2	7

Sandy River District, McDowell County.

In Sandy River, the Gilbert Coal as a minable seam is confined to the waters of Tug Fork above the mouth of Fourpole Creek, as shown on Figure 19, and in this District, there are several country banks in this bed, opened by natives for local domestic fuel, the seven following openings therein having been examined by the writer:

Coal Opening—No. 393 on Map II.

On east hillside of Johnnycake Branch, 0.4 mile south of road summit in low gap on County Line; **Gilbert Coal**; elevation, 1370' B.

		Ft.	In.
Concealed			
Shale, sandy.....		6	0
Coal, soft.....	0' 2 "		
Slate, black.....	0 0¼		
Coal, soft (slate floor).....	2 0	2	2¼

Coal Opening—No. 394 on Map II.

On head of branch of Johnnycake, 0.6 mile eastward from Opening No. 393 last described; **Gilbert Coal**; elevation, 1405' B.

		Ft.	In.
Concealed			
Shale, bluish gray, sandy.....		6	0
Coal, soft.....0'	0 1/4"		
Slate, black.....0	0 1/4		
Coal, soft.....0	2		
Slate, black.....0	0 1/4		
Coal, soft, columnar (slate floor).....2	6	2	8 3/4

Coal Opening—No. 395 on Map II.

On east hillside of Negro Branch of Tug Fork, 2.5 miles northwest of Iaeger and 0.6 mile west of Opening No. 393; **Gilbert Coal**; elevation, 1315' B.

		Ft.	In.
Concealed			
Sandstone, platy and massive, medium grained, greenish gray.....		6	0
Coal, soft.....0'	1 1/2"		
Slate, black.....0	0 1/8		
Coal, soft.....0	5 1/2		
Slate, black.....0	0 1/8		
Coal, soft (slate floor).....2	0	2	7 1/4

Coal Opening—No. 19 on Map II.

In ravine on west side of Johnnycake Branch, 2 miles due north of Iaeger; **Gilbert Coal**; elevation, 1365' B.

		Ft.	In.
Shale, sandy.....		15	0
Coal, soft.....0'	1 1/2"		
Slate, black.....0	0 1/8		
Coal, medium soft, columnar (slate floor).....2	8	2	9 5/8

A sample for analysis was collected here by the writer from the entire bed-section, the composition of which is published under **No. 19** in the table of coal analyses at the end of this Chapter.

Coal Opening—No. 396 on Map II.

On fork of Lick Branch, 0.7 mile north of Iaeger; **Gilbert Coal**; elevation, 1520' B.

	Ft.	In.
Concealed		
Shale, sandy.....	4	0
Coal, medium soft (floor, slate and concealed)....	2	10

Here, as also at the following digging, it is known locally as the "Lick Branch" seam:

Coal Opening—No. 397 on Map II.

On Lick Branch, 2 miles northeast of Iaeger and 0.7 mile northwest of mouth of Sandy Huff Branch; **Gilbert Coal**; elevation, 1640' B.

	Ft.	In.
Concealed		
Sandstone, massive.....	8	0
Coal, medium soft (slate floor).....	2	8

Coal Opening—No. 398 on Map II.

Three-tenths mile northeast of Height, 1.1 miles due west of Peapatch and near State Line; **Gilbert Coal**; elevation, 2670' B.

	Ft.	In.
Sandstone, Lower Gilbert		
Coal, soft, visible.....	2'	0"
Coal, concealed, but reported (slate floor).....	1	6
	3	6

The above opening comes 130 feet below the crop of the Glenalum Tunnel Coal in the ridge road due south.

The following exposure, in the extreme southeastern point of Sandy River District, was examined by Gawthrop:

Coal Exposure—No. 399 on Map II.

On extreme head of Hite Fork of Bradshaw Creek, 0.1 mile northwest of Peapatch; **Gilbert Coal**; elevation, 2645' B.

	Ft.	In.
Concealed		
Coal, soft.....	0'	10"
Shale, gray.....	1	0
Coal, soft (slate floor).....	1	4
	3	2

Browns Creek District, McDowell County.

In Browns Creek, the Gilbert Coal is confined to a few scattered patches in the northwest margin of the District. No exposures were observed on it either at prospects or outcrop, but it is probably of the same character here as described for Openings Nos. 393 to 395 on preceding pages of this Chapter.

Big Creek District, McDowell County.

In Big Creek, the Gilbert Coal is confined to several scattered patches near the ridge summits in the west and southwest margins of the District. In this region the following opening was examined by Gawthrop:

Coal Opening—No. 400 on Map II.

On head of Straight Fork, 1.4 miles due north of summit of Bearwallow Knob; **Gilbert Coal**; elevation, 2875' B.

	Ft.	In.
Concealed		
Shale, gray, silicious.....	4	0
Coal, soft, visible.....1' 3"		
Coal, concealed by water, re- ported.....0 5	1	8

Quantity of Gilbert Coal Available.

Based on the evidence above given and a planimetric determination of the area by Gawthrop from Map II and as outlined on Figure 19, the following estimate is made for the amount of Gilbert Coal available:

Probable Amount of Gilbert Coal.

Counties by Districts.	Thickness of Coal Assumed.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana	2	30.00	19,200	1,672,704,000	66,908,160
Clear Fork	2	20.00	12,800	1,115,136,000	44,605,440
Baileysville	2	12.90	8,256	719,262,720	28,770,508
Huff Creek	2	25.00	16,000	1,393,920,000	55,756,800
Slab Fork	2	10.00	6,400	557,568,000	22,302,720
Center	2	1.00	640	55,756,800	2,230,272
Totals		98.90	63,296	5,514,347,520	220,573,900
McDowell:					
Sandy River	2	55.00	35,200	3,066,624,000	122,664,960
Browns Creek	2	0.80	512	44,605,440	1,784,217
Big Creek	2	0.50	320	27,878,400	1,115,136
Totals		56.30	36,032	3,139,107,840	125,564,313
Totals for Both Counties..		155.20	99,328	8,653,455,360	346,138,213

MINABLE COALS OF THE NEW RIVER GROUP.

THE DOUGLAS COAL.

The Douglas Coal, described in Chapter VI, pages 181 and 182, is quite an important seam, having been mined commercially in McDowell County as mentioned on the pages last cited. Its minable area is indicated on Figure 20, as also its approximate western boundary line, west of which it has probably thinned below minable dimensions—18 inches. Its outcrop may be readily determined in the region of its occurrence, since it belongs only 100 to 130 feet below the Gilbert bed, the details of which are outlined on Map II. In addition to the commercial mines it has also been opened and prospected quite extensively for local domestic fuel by natives and large land holding companies in each County. Its thickness and character at these diggings will now be described by magisterial districts.

Oceana District, Wyoming County.

In Oceana District, the Douglas Coal as a minable seam is apparently confined to the southeast border as shown on Figure 20, the six following openings, examined by the writer, being located in this region:

Coal Opening—No. 401 on Map II.

In ravine on north hillside of Clear Fork, 0.3 mile northwest of Crany; **Douglas Coal**; elevation, 1605' B.

	Ft.	In.
Sandstone, massive, Nuttall, visible.....	15	0
Coal, soft (floor, slate and concealed).....	1	8

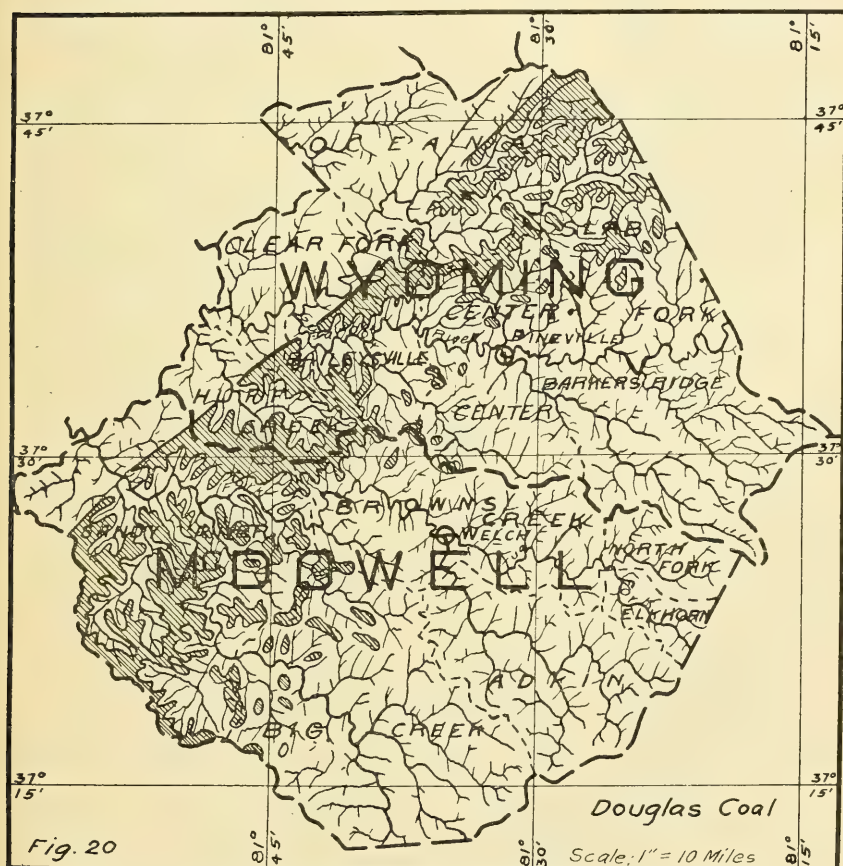


Figure 20.—Showing Approximate Movable Area of the Douglas Coal, (See explanations in Author's Preface).

Coal Opening—No. 402 on Map II.

In ravine on west hillside of Clear Fork, 1.2 miles northeast of Crany and 0.4 mile north of mouth of Rockhouse; **Douglas Coal**; elevation, 1750' B.

		Ft.	In.
Sandstone roof, visible.....		2	0
Shale		0	3
Coal , soft.....	0' 2"		
Slate, dark gray.....	0 0½		
Coal , soft.....	0 10		
Sand slate, dark.....	0 1		
Coal , soft (slate floor).....	1 8½	2	10

Coal Opening—No. 20 on Map II.

On south hillside of Clear Fork, 1.1 miles southwest of mouth of Knob Fork and 3.2 miles westward from Clear Fork Gap; **Douglas Coal**; elevation, 1805' B.

		Ft.	In.
1. Sandstone, massive, visible, Nuttall		20	0
2. Coal , soft.....	0' 10"	2	1
3. Sand slate, hard, dark....	0 1		
4. Coal , soft.....	1 2		
5. Slate, black, iron ore nodules.....		25	0
6. Limestone, hard, silicious, lenticular.....		0	6

The hard sandy slate—No. 3 of section—is typical of the Douglas Coal on the head of Clear Fork. A sample for analysis was collected by the writer from Nos. 2 and 4 at the above opening, the composition of which is published under **No. 20** in the table of coal analyses at the end of this Chapter. The results show it exceptionally low in impurities—ash and sulphur.

Coal Opening—No. 403 on Map II, 200 yards southwestward, 10 feet lower in elevation, is in the Douglas seam, where it has practically the same bed-section.

John Duncan Coal Opening—No. 404 on Map II.

On south hillside of Rockhouse Branch of Clear Fork, 0.8 mile northeast of mouth of Wolfpen Branch; **Douglas Coal**; elevation, 2040' B.

		Ft.	In.
Sandstone, massive.....		15	0
Coal , soft.....	1' 0"		
Sand slate, hard, dark.....	0 1		
Coal , soft (slate floor).....	1 10	2	11

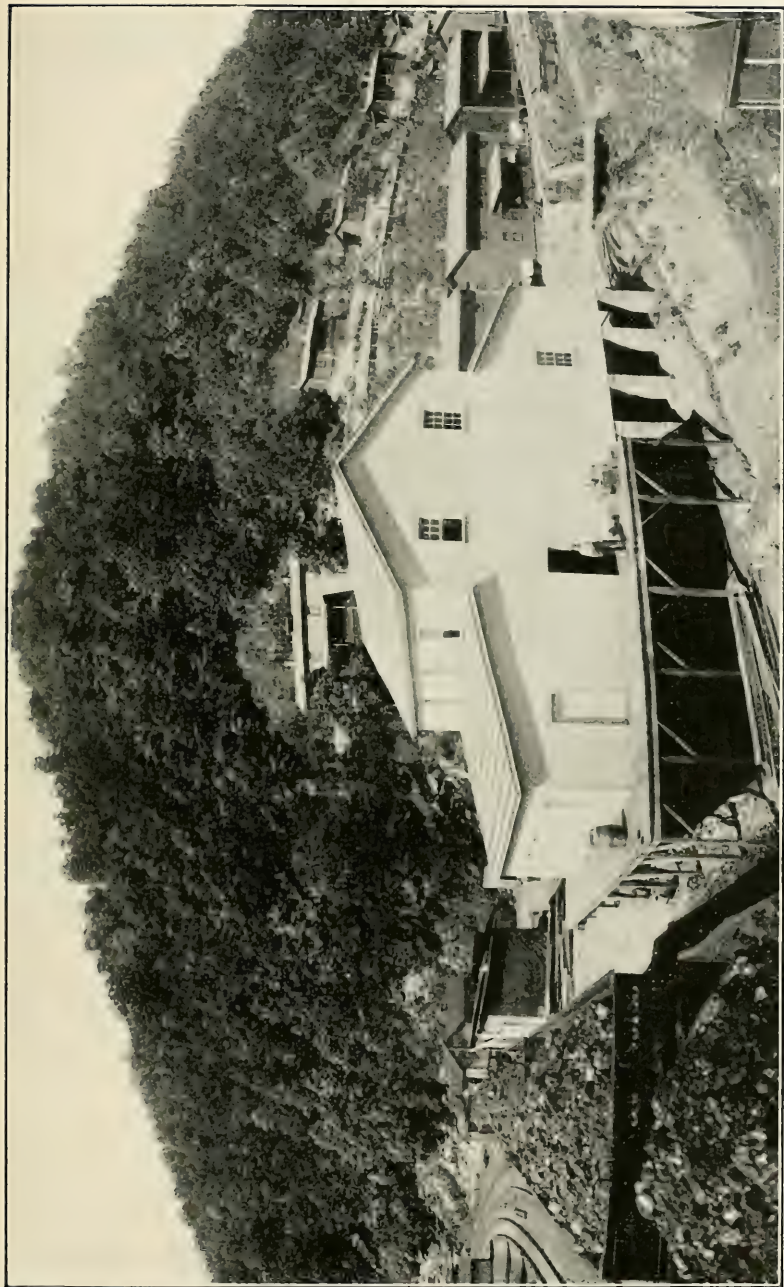


PLATE XXII—Showing portion of the new mining village of Douglas, McDowell County, topography of the New River Group and the Panther Sandstone along railroad grade.—Photo by courtesy of William Leckie of Welch.

Wyoming-Pocahontas Coal Co. Prospect—No. 405 on Map II.

On south hillside of Rockhouse Branch, 0.3 mile south of Opening No. 404 last described; **Douglas Coal**; elevation, 2095' B.

		Ft.	In.
Sandstone, massive		20	0
Coal, medium soft	0' 9½"		
Sand slate, hard, dark	1		
Coal, medium soft	1 2		
Slate, black	1		
Coal, medium soft (slate floor) 0	11½	3	1

The two following openings on the waters of Laurel Fork and in Oceana District were examined by Gawthrop:

Coal Exposure—No. 406 on Map II.

On northwest hillside of Laurel Fork, 2 miles northeast of Jesse and 0.3 mile west of mouth of John O Branch; **Douglas Coal**; elevation, 1695' B.

		Ft.	In.
Sandstone, massive		10	0
Coal, medium soft	0' 3"		
Bone	0 3		
Coal, medium soft	1 3	1	9
Shale and concealed		5	0
Sandstone, massive		35	0

Coal Opening—No. 407 on Map II.

On head of Chestnut Flats Branch, 0.4 mile northward from common corner of Oceana, Center and Clear Fork Districts; **Douglas Coal**; elevation, 1610' B.

		Ft.	In.
Sandstone, flaggy, rotten		5	0
Coal, soft, columnar	1' 8"		
Slate, black	0 6		
Coal, bony	0 4		
Coal, soft (slate floor)	0 6	3	0

Slab Fork District, Wyoming County.

In Slab Fork, the Douglas Coal is confined to near the ridge summits in several scattered patches in the northwest portion of the District, as shown on Figure 20. In this region Gawthrop collected a sample for analysis and obtained the following data at a digging in this bed:

**Wyoming-Pocahontas Coal & Coke Co. Coal Prospect—
No. 23 on Map II.**

On south hillside of Milam Fork, 2.3 miles southeast of McGraw and 1.4 miles southwest of Polk Gap; **Douglas Coal**; elevation, 2150' B.

		Ft.	In.
1. Sandstone, flaggy.....		5	0.
2. Coal, soft, columnar.....	0' 8"		
3. Bone	0 3		
4. Coal, medium soft.....	1 0		
5. Coal, soft, columnar	1 9	3	8
<hr/>			
6. Shale and concealed.....			

The composition of the sample from Nos. 2, 4 and 5 of the section is published under **No. 23** in the table of coal analyses at the end of this Chapter. The results prove its high grade fuel qualifications, since it is very low in sulphur and comparatively low in ash.

Clear Fork District, Wyoming County.

In Clear Fork, the Douglas Coal as a minable seam is confined to the two southeast points of the District, as exhibited on Figure 20. No exposures either at prospects or outcrop were observed on it in this region, but it is probably present in the same development as described below for the immediately adjoining portions of Baileysville and Center Districts.

Baileysville District, Wyoming County.

In Baileysville District, the Douglas Coal has been opened at several country banks by natives, where it enjoys an excellent reputation for local domestic fuel, as also for smithing purposes. In the northern edge of the District, the following opening was examined by Gawthrop:

H. P. Toler Coal Opening—No. 408 on Map II.

On south hillside of Laurel Branch, 1.2 miles southeast of Ellick and 2.2 miles northeast of Baileysville; **Douglas Coal**; elevation, 1475' B.

		Ft.	In.
Concealed			
Shale, gray, silicious.....		5	0
Coal, soft.....	0' 10"		
Shale	1 0		
Coal, soft.....	1 2	3	0
<hr/>			
Concealed		15	0
Sandstone, massive.....		15	0

The five following openings in Baileysville District were examined by the writer:

Cole & Crane Coal Opening—No. 21 on Map II, located on the east side of Pomp Hollow, 0.4 mile northeast of Baileysville, is in the Douglas bed. Its thickness and bed-structure at this digging are exhibited in the Baileysville Section published in Chapter IV, page 66. A sample for analysis was collected from the entire bed-section, excepting the two thin slate partings, the composition of which is given under **No. 21** in the table of coal analyses at the end of this Chapter.

Coal Opening—No. 409 on Map II.

On the west hillside of David Branch of Guyandot River, 0.5 mile northwest of Baileysville; **Douglas Coal**; elevation, 1405' B.

		Ft.	In.
Sandstone, massive, making cliff, Nuttall , visible.		25	0
Shale, sandy, flaggy, dark.....		15	0
Coal and slate, interlaminated.0'	4"		
Coal, hard, slaty.....	0 5		
Coal, soft, columnar.....	2 0		
Slate, black, $\frac{1}{8}$ " to.....	0 0 $\frac{1}{4}$		
Coal, soft, columnar (slate floor)	1 4	4	1 $\frac{1}{4}$

Coal Opening—No. 410 on Map II.

On south hillside of Guyandot River, 2 miles southwest of Baileysville and 0.3 mile due east of mouth of Horse Creek; **Douglas Coal**; elevation, 1320' B.

	Ft.	In.
Concealed		
Slate, bluish gray.....	2	0
Coal, medium soft	2	0
Slate and concealed.....	75	0
Sandstone, Lower Nuttall , great cliff rock.....	40	0

Coal Opening—No. 411 on Map II.

On southwest hillside of Moccasin Branch, 0.7 mile southeast of Opening No. 410, last described; **Douglas Coal**; elevation, 1415' B.

	Ft.	In.
Concealed		
Shale, dark gray.....	7	0
Slate, black.....	0	2
Coal, soft (slate floor).....	2	9

Coal Opening—No. 412 on Map II. .

On head of Moccasin Branch, west side of trail, 2 miles southwest of Baileysville; **Douglas Coal**; elevation, 1545' B.

	Ft.	In.
Concealed		
Shale, bluish gray.....	2	0
Coal , soft (slate floor).....	2	9

The seven following openings in the same District were examined by Gawthrop:

Cole & Crane Coal Prospect—No. 413 on Map II.

In ravine on east side of Horse Creek, 2.3 miles southwest of Baileysville and 1.3 miles south of mouth of Moccasin; **Douglas Coal**; elevation, 1530' B.

	Ft.	In.
Shale, gray, silicious.....	5	0
Coal , soft (shale floor).....	2	7

Cole & Crane Coal Opening—No. 414 on Map II.

On head of branch of Sinkers Fork of Little Cub, 0.7 mile southeast of Opening No. 413 above; **Douglas Coal**; elevation, 1580' B.

	Ft.	In.
Shale, gray, silicious.....	2	0
Coal , soft, columnar.....0' 10"		
Coal , harder, columnar.....1 3		
Coal , soft, columnar (shale floor) .....0 10	2	11

Cole & Crane Coal Opening—No. 415 on Map II.

On east hillside of Little Cub Creek, 2.2 miles due south of Baileysville; **Douglas Coal**; elevation, 1660' B.

	Ft.	In.
Shale, gray, silicious.....	10	0
Coal , soft, columnar.....0' 8"		
Coal , harder, columnar.....1 2		
Coal , soft, columnar.....0 11	2	9
Shale and concealed.....	10	0
Sandstone, massive, gray and hard, Lower Nuttall	25	0

Coal Opening—No. 416 on Map II.

On west hillside of Little Cub Creek, 1.1 miles southward from Opening No. 415 above; **Douglas Coal**; elevation, 1680' B.

		Ft.	In.
Shale, gray, silicious.....		10	0
Coal, soft, columnar.....	0' 8"		
Coal, harder, columnar.....	0 10		
Coal, soft, columnar (slate floor)	1 2	2	8

Coal from the above opening was used in firing locomotives on a lumber railway in the immediate region.

Coal Opening—No. 417 on Map II.

On west hillside of Trace Fork, 1.2 miles southwest of Brier, and 0.6 mile southeast of Opening No. 416; **Douglas Coal**; elevation, 1750' B.

		Ft.	In.
Shale, gray, silicious.....			
Coal, soft, columnar.....	0' 9"		
Coal, harder, columnar.....	1 4		
Coal, soft, columnar (shale floor)	0 8	2	9

The uniformity of the bed-section of the Douglas Coal in Baileysville District is strikingly exhibited in the seven openings last given, as also in the two following, examined by Gawthrop:

Coal Opening—No. 418 on Map II.

On the east hillside of Trace Fork of Brier, 0.8 mile due south of Brier P. O.; **Douglas Coal**; elevation, 1835' B.

		Ft.	In.
Shale, gray, silicious.....		10	0
Coal, soft, columnar.....	0' 8"		
Coal, harder, columnar.....	1 4		
Coal, soft, columnar (shale floor)	0 8	2	8

Cole & Crane Coal Opening—No. 419 on Map II.

On east hillside of Indian Creek, 1.3 miles southeast of Baileysville and 0.6 mile southeast of mouth of Ralph Branch; **Douglas Coal**; elevation, 1640' B.

			Ft.	In.
Shale				
Coal, soft, columnar, with streaks of "mother coal".	0'	10"		
Coal, harder, columnar.....	1	5½		
Coal, soft, columnar (shale floor)	0	8	2	11½

Coal Opening—No. 420 on Map II.

On south hillside, 0.6 mile up Spencer Fork of Shannon Mill Creek, 4.4 miles northeast of Baileysville; **Douglas Coal**; elevation, 1660' B.

Coal, concealed, opening closed, but reported 18 inches in thickness by Walter Miller, a native.

Center District, Wyoming County.

In Center District, the Douglas Coal is confined to the northwest border, the following opening, examined by Gawthrop, in this region, being fairly representative of its development:

Frank Webb Coal Opening—No. 421 on Map II.

On west hillside of Laurel Fork of Turkey Creek, 0.5 mile northeast of Opening No. 420 above; **Douglas Coal**; elevation, 1650' B.

			Ft.	In.
Shale, gray.....			5	0
Sandstone, shaly.....			5	0
Coal, soft, columnar.....	2'	6"		
Coal, concealed by water, reported	1	0	3	6

The above opening comes 125 feet in elevation below another—No. 390 on Map II—in the Gilbert Coal, on the opposite hillside of Laurel Fork.

Huff Creek District, Wyoming County.

In Huff Creek District, the Douglas Coal has been extensively opened and prospected by natives for local domestic fuel. As shown on Figure 20, its minable area is confined to the southeastern portion of the District. The following crop exposure, examined by the writer, is on the west margin of its approximate minable area as outlined on this Figure.

Coal Exposure—No. 422 on Map II.

On east edge of road on Left Fork, 0.9 mile southward from mouth of Muzzle Fork; **Douglas Coal**; elevation, 1185' B.

	Ft.	In.
Sandstone, flaggy.....	10	0
Coal, soft.....	2	2
Shale, gray, sandy, to creek.....	5	0

The eleven following openings on this coal, all in the southeastern portion of Huff Creek District, were examined by Gawthrop:

Coal Opening—No. 423 on Map II.

On east bank, 0.6 mile up Buffalo Creek and 2.9 miles southeast of Hanover; **Douglas Coal**; elevation, 1220' B.

	Ft.	In.
Shale, gray, silicious.....	10	0
Coal, soft, columnar.....0'	6½"	
Slate, 0" to.....0	0¼	
Coal, soft, columnar.....0	10	
"Mother" coal.....0	0¼	
Coal, soft, columnar.....0	7½	
Slate, 0" to.....0	0¼	
Coal, soft, columnar (shale floor).....0	7¼	
	2	8

Lee Belcher Coal Opening—No. 22 on Map II.

On west hillside of Buffalo Creek, 0.8 mile south of Opening No. 423 above; **Douglas Coal**; elevation, 1270' B.

	Ft.	In.
1. Concealed and shale.....		
2. Coal, soft, columnar.....1'	11"	
3. Shale, sulphurous, 0" to.....0	0¼	
4. Coal, soft, columnar (shale floor).....0	6¾	
	2	6

Gawthrop collected a sample for analysis from Nos. 2 and 4 only of the above section, the composition of which is published under No. 22 in the table of coal analyses at the end of this Chapter.

Coal Prospect—No. 424 on Map II.

On north hillside of Little Huff Creek, opposite mouth of Pad Fork, 5 miles southwest of Baileysville; **Douglas Coal**; elevation, 1410' B.

	Ft.	In.
Concealed		
Shale, gray, silicious.....	6	0
Coal, soft.....	2	7
Shale and concealed.....	10	0
Sandstone, massive, visible.....	25	0

Coal Prospect—No. 425 on Map II.

On east hillside of Pad Fork of Little Huff Creek, 0.5 mile south-east of Opening No. 424 above; **Douglas Coal**; elevation, 1475' B.

	Ft.	In.
Shale, gray, silicious.....		
Coal, soft.....	2	6
Shale and concealed.....	10	0
Sandstone, massive, Lower Nuttall	45	0

Coal Opening—No. 426 on Map II.

In drain on southwest hillside of Pad Fork of Little Huff Creek, 0.5 mile northwest of mouth of Righthand Fork; **Douglas Coal**; elevation, 1500' B.

	Ft.	In.
Shale, gray, silicious, visible.....		
Coal, soft.....0' 10"		
Coal, harder.....1 5		
Coal, soft.....0 9	3	0
Shale and concealed.....	5	0
Sandstone, massive		

Coal Opening—No. 427 on Map II.

On east hillside of Pad Fork of Little Huff Creek, 0.3 mile north of mouth of Righthand Fork; **Douglas Coal**; elevation, 1520' B.

	Ft.	In.
Concealed and shale.....	5	0
Coal, soft, columnar.....1' 2"		
Coal, concealed, reported.....1 2	2	4
Concealed	5	0
Sandstone, massive, visible.....	15	0

Coal Prospect—No. 428 on Map II.

On head of Righthand Fork of Pad Fork, 1.3 miles due south of Opening No. 426 above; **Douglas Coal**; elevation, 1565' B.

	Ft.	In.
Concealed and shale.....		
Coal , soft (shale floor).....	2	8

Francis Lasher Coal Opening—No. 429 on Map II.

On south hillside of Little Huff Creek, 4.3 miles southwest of Baileysville and 0.3 mile west of mouth of Taylor Branch; **Douglas Coal**; elevation, 1585' B.

	Ft.	In.
Concealed and gray shale.....		
Coal , soft, columnar.....0' 9"		
Coal , harder, columnar.....1 7		
Coal , soft, columnar (shale floor) .....0 4	2	8

Coal Opening—No. 430 on Map II.

In Rocky Branch of Little Huff Creek, 0.6 mile north of Opening No. 429 above; **Douglas Coal**; elevation, 1570' B.

	Ft.	In.
Shale, gray, silicious.....	5	0
Coal , medium soft.....0' 10"		
Bone .....0 1		
Coal , soft, columnar.....0 11	1	10

Shale and concealed.....

G. A. Deskins Coal Opening—No. 431 on Map II.

On north edge of road, 0.6 mile up Road Branch of Little Huff Creek, 3 miles due south of Baileysville; **Douglas Coal**; elevation, 1700' B.

	Ft.	In.
Concealed and shale.....		
Coal , soft, columnar (shale floor).....	2	8

Francis Lasher Coal Opening—No. 432 on Map II.

On head of Little Huff Creek, 1¼ miles due west of common corner of Baileysville, Browns Creek and Huff Creek Districts; **Douglas Coal**; elevation, 1700' B.

	Ft.	In.
Shale, gray, silicious.....	8	0
Coal , soft, columnar.....0' 8"		
Coal , harder, columnar.....1 0		
Coal , soft, columnar.....1 0	2	8

Shale and concealed.....

Sandy River District, McDowell County.

In Sandy River District, the Douglas Coal is quite persistent and regular in its development in the region outlined on Figure 20 as covering its approximate minable area, and it is mined commercially at Douglas Station, slightly less than one mile east of Panther, and on the west hillside of Dry Fork, 1.3 miles southeast of Iaeger. It has also been opened at several country banks by natives for domestic fuel, where it is locally known as the "Red Ash" seam. The 3 following openings on the north side of Tug Fork were examined by the writer:

Coal Opening—No. 433 on Map II.

On head of Lick Branch, 0.9 mile northwest of mouth of Sandy Huff and 2 miles northeast of Iaeger; **Douglas Coal**; elevation, 1445' B.

		Ft.	In.
Concealed			
Sandstone, shaly, calamite fossil plants.....		4	0
Coal, soft.....	2' 5"		
Coal, bony (slate floor).....	0 4	2	9

The **E. Vance Coal Opening 434 on Map II**, on east bank of Negro Branch, 2.2 miles northwest of Iaeger and 1.2 miles northeast of mouth of War Branch, at an elevation of 1210' B., is in the Douglas bed. The digging had fallen shut, but the coal is reported to have a thickness of 32 inches, without partings.

Coal Opening—No. 435 on Map II.

On east hillside of War Branch, 2.6 miles northwest of Iaeger and 1.2 miles due north of mouth of Negro Branch; **Douglas Coal**; elevation, 1185' B.

	Ft.	In.
1. Concealed		
2. Shale, sandy, bluish gray.....	5	0
3. Limestone, bluish gray, silicious, 6" to.....	0	8
4. Shale, sandy, greenish.....	5	0
5. Shale, bluish gray, with calamite fossil stems abundant at base.....	7	0

			Ft.	In.
6. Coal, soft, bright, columnar	1'	0"		
7. Slate, black, with coal streaks	0	7		
8. Coal, medium soft, columnar (slate floor).....	1	7	3	2

A sample for analysis was collected and the following data obtained by Gawthrop at a commercial mine in this bed on the east hillside of Shortpole Branch of Tug Fork. Its stratigraphic position here is exhibited in the Douglas Station Section in Chapter IV, pages 90-1. The 15 inches of coal, 7 feet above the main bench, appears to be split off this seam as it is represented in Wyoming County, the interval separating the two divisions being only 7 inches at Opening No. 435 above:

Panther Coal Co. No. 2 Mine—No. 24 on Map II.

Sandy River District, 0.2 mile northeast of Douglas; **Douglas Coal.**

			Ft.	In.
1. Concealed and shale.....				
2. Coal, soft			1	3
3. Shale, gray			5	0
4. Shale, dark, with coal streaks.....			2	0
5. Coal, medium soft, columnar	1'	10"		
6. Coal, soft.....	0	5½		
7. Sulphur	0	0½		
8. Coal, soft, columnar.....	0	3	2	7
9. Shale and concealed.....				

"Tidal elevation, 1076' L.; coal owned by Sibley Coal & Coke Co.; principal office, Welch; daily capacity, 35 tons; daily output, 25 tons; 2 laborers and 4 miners employed; mule haulage; used for steam on N. & W. Ry.; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 5, 6 and 8 of section at face of Main Air Course opposite First Left Heading by R. M. Gawthrop; S. M. Blackwell, Foreman, authority for data."

The composition and calorific value of the sample is published under **No. 24** in the table of coal analyses at the end of this Chapter.

The two following openings, in the same District, were examined by the writer:

Coal Opening—No. 435A on Map II.

On east hillside of Panther Creek, 0.6 mile due south of Panther;
Douglas Coal; elevation, 1055' B.

			Ft.	In.
Concealed and shale.....				
Coal , soft.....	0'	9"		
Slate, black, with coal streaks..	3	0		
Coal , soft (black slate floor)..	2	0	5	9

Coal Opening—No. 436 on Map II.

On southeast bank of Greenbrier Fork of Panther, 0.9 mile south-
 west of Panther Station; **Douglas Coal**; elevation, 1035' B.

			Ft.	In.
Concealed				
Shale, bluish gray, sandy.....			7	0
Coal , soft.....	0'	10"		
Slate, black, with coal streaks, and fossil plants abun- dant	3	6		
Coal , soft (slate floor).....	1	6	5	10

The above opening is at the west margin of the approxi-
 mate minable area of the Douglas bed as outlined on Figure
 20, the mining bench being only 18 inches in thickness. The
 ten following openings on the waters of Panther and Horse
 Creeks and Coon Branch, all in Sandy River District, were
 examined by Gawthrop:

Coal Opening—No. 437 on Map II.

On south hillside, 0.8 mile up Trap Fork of Panther Creek;
Douglas Coal; elevation, 1100' B.

			Ft.	In.
Concealed				
Shale, gray.....			3	0
Coal , soft, columnar.....			2	5
Shale and concealed.....			5	0
Sandstone, massive, and concealed, to Trap Fork.			20	0

Coal Opening No. 437A on Map II, on the south hillside
 of Panther Creek, 1.8 miles southeast of Panther and $1\frac{1}{2}$ mile
 due east of mouth of Trace Fork, is in the Douglas bed, at an
 elevation of 1200' B. The digging was closed when visited
 by Gawthrop.

Coal Opening—No. 437B on Map II.

On east hillside of Panther Creek, 2.4 miles southeast of Panther and 0.8 mile northwest of Cub Branch; **Douglas Coal**; elevation, 1255' B.

	Ft.	In.
Sandstone, massive	5	0
Shale	2	0
Coal, soft, visible.....1' 6"		
Coal, concealed, reported.....1 0	2	6
<hr/>		
Shale and concealed.....	5	0
Sandstone, massive, gray and hard, Lower Nuttall	30	0

Coal from this opening was used by the Panther Lumber Company in firing locomotives on the temporary railway utilized in removing the timber from the drainage of Panther Creek.

Coal Opening—No. 438 on Map II.

On north hillside, 0.4 mile up Cub Branch of Panther Creek and 3 miles southwest of Iaeger; **Douglas Coal**; elevation, 1305' B.

	Ft.	In.
Shale, gray, silicious.....	8	0
Coal, soft, columnar.....	2	4
Shale and concealed.....	5	0
Sandstone, massive, hard, gray, Lower Nuttall ...	50	0
Concealed		

Coal Opening—No. 439 on Map II.

On north hillside of George Branch of Panther Creek, 1 mile above mouth, 3 miles southwest of Iaeger; **Douglas Coal**; elevation, 1385' B.

	Ft.	In.
Concealed		
Shale, gray, silicious.....	10	0
Coal, soft, columnar.....	2	2
Shale and concealed.....	5	0
Sandstone, massive, visible.....	15	0

Coal Opening—No. 440 on Map II.

On southwest hillside of George Branch of Panther, 0.4 mile southeast of Opening No. 439 above; **Douglas Coal**; elevation, 1410' B.

	Ft.	In.
Shale, gray.....	10	0
Coal, soft, columnar.....	2	2
Shale and concealed.....		

Coal Opening—No. 441 on Map II.

On west hillside, 1 mile up Horse Creek and $2\frac{1}{2}$ miles westward from Iaeger; **Douglas Coal**; elevation, 1285' B.

	Ft.	In.
Shale, gray, silicious.....	5	0
Coal , soft (slate floor).....	2	0

Coal Opening—No. 442 on Map II.

On west hillside, 1.7 miles up Horse Creek, 2 miles southwest of Iaeger; **Douglas Coal**; elevation, 1340' B.

	Ft.	In.
Shale, gray, silicious.....	15	0
Coal , soft, columnar.....	2	3
Shale and concealed.....	10	0
Sandstone, massive.....	10	0

Coal Opening—No. 443 on Map II.

On east branch of Horse Creek, 1.5 miles southeast of Opening No. 442 above; **Douglas Coal**; elevation, 1445' B.

	Ft.	In.
Shale, gray, silicious.....	5	0
Coal , soft, columnar (shale floor).....	2	6

Coal Opening—No. 444 on Map II.

On southeast side of Coon Branch of Dry Fork, 1.6 miles southwest of Iaeger; **Douglas Coal**; elevation, 1460' B.

	Ft.	In.
Sandstone, flaggy, visible.....	6	0
Shale, gray, silicious.....	2	0
Coal , soft, columnar.....	2	10
Shale and concealed.....		

A sample for analysis was collected and the following data obtained at another commercial mine in this bed along the west hillside of Dry Fork. Its stratigraphic position at this opening is shown in the Iaeger—1.3 Miles Southeast Section, in Chapter IV, pages 177-8:

Lone Jack Coal Mining Co. Mine—No. 25 on Map II.Sandy River District, 1.5 miles southeast of Iaeger; **Douglas Coal**

		Ft.	In.
1. Concealed			
2. Shale, gray, very silicious.....	10		0
3. Coal, medium hard, columnar	1'	0"	
4. Coal, softer, columnar....	1	1	
5. Coal, very soft.....	0	4	2 5
6. Slate and concealed.....			

"Tidal elevation, 1475' B.; coal owned by Mayers Land Co.; principal office, Iaeger; daily capacity, 100 tons; daily output, 80 tons; 8 laborers and 15 miners employed; mule haulage; used for steam and domestic fuel; shipped mostly West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 3, 4 and 5 of section in Room No. 6 off Main Straight Heading by R. M. Gawthrop; V. T. Strickler, Superintendent, authority for data."

The composition of the sample is published under **No. 25** in the table of coal analyses at the end of this Chapter. The coal from this operation, as also from Mine 24 on Map II at Douglas, described on a preceding page of this Chapter, has an excellent reputation for steam and domestic fuel to the extent that it can be profitably mined, although only slightly over 2 feet in thickness. The following opening was examined by Gawthrop:

Coal Opening—No. 445 on Map II.

One-half mile northwest of mouth of Grapevine Branch and 1.6 miles southwest of Avondale (Ritter); **Douglas Coal**; elevation, 1780' B.

	Ft.	In.
Shale, silicious	8	0
Coal, soft, columnar (floor concealed).....	2	5

The following opening was examined by the writer:

Coal Opening—No. 446 on Map II.

On east hillside of Grapevine Branch of Dry Fork, 0.4 mile due west of Opening No. 445 above; **Douglas Coal**; elevation, 1720' B.

	Ft.	In.
Concealed		
Shale, buff and bluish, sandy.....	8	0
Coal, soft, columnar (slate floor).....	2	6

The following opening was examined by Gawthrop:

Coal Opening—No. 447 on Map II.

On north hillside of Beartown Branch of Dry Fork, 1.1 miles west of Beartown; **Douglas Coal**; elevation, 1765' B.

			Ft.	In.
Sandstone, flaggy and shaly.....				
Coal, slaty.....	0'	2"		
Coal, medium soft (shale floor)	1	11	2	1

The five following openings in that portion of Sandy River District lying on the east side of Dry Fork were examined by Gawthrop:

Coal Opening—No. 448 on Map II.

On southwest hillside of Slaunch Branch, 1.2 miles N. 70° E. of Beartown; **Douglas Coal**; elevation, 1925' B.

			Ft.	In.
Shale, gray, silicious.....			5	0
Coal, medium soft.....	1'	3"		
Coal, soft, columnar (shale floor)	1	1	2	4

Coal Opening—No. 449 on Map II.

On west hillside of Slaunch Branch of Dry Fork, 0.6 mile southeast of Opening No. 448 above; **Douglas Coal**; elevation, 1965' B.

			Ft.	In.
Shale, gray, silicious.....			5	0
Coal, medium soft, columnar..	1'	3"		
Coal, soft, columnar (shale floor)	1	1	2	4

At **Coal Opening No. 450 on Map II**, on waters of Ring Branch, 1.2 miles southeast of Opening No. 448 above, the **Douglas Coal** is reported 28 inches in thickness and comes at an elevation of 1980' B.

Coal Opening—No. 451 on Map II.

On head of a left fork of Ring Branch, 2.7 miles southeast of Avondale, and same distance eastward from Beartown; **Douglas Coal**; elevation, 2025' B.

			Ft.	In.
Shale, gray, silicious.....			5	0
Coal, medium soft, columnar..	0'	6"		
Coal, harder, columnar.....	1	3		
Coal, soft, columnar (shale floor)	0	7	2	4

Coal Opening No. 452 on Map II, located on waters of Crane Creek, 3.6 miles southeast of Avondale and 2.1 miles northeast of Opening No. 451 above, at an elevation of 2130' B., had fallen shut when visited by Gawthrop. Here, Elmer Blankenship—a native—reports it 42 inches thick, figures that appear about 10 inches too great for this remarkably uniform bed. In the southeast portion of Sandy River District, the two following openings on the waters of Hite Fork of Bradshaw Creek, were examined by Gawthrop:

Blaine Buckett Coal Opening—No. 453 on Map II.

In ravine on east side of Hite Fork, 1.7 miles east of mouth of Aldrich Fork; **Douglas Coal**; elevation, 2090' B.

			Ft.	In.
Shale, visible.....			3	0
Coal, soft, columnar.....	1'	1"		
Coal, slaty.....	0	2		
Coal, soft, columnar (shale floor)	0	9	2	0

Coal Opening—No. 454 on Map II.

On south hillside of Hite Fork, 0.4 mi'e southeast of mouth of Aldrich Fork; **Douglas Coal**; elevation, 2035' B.

			Ft.	In.
Sandstone, massive, gray and hard.....				
Coal, soft, columnar.....	1'	8"		
Slate, 0" to.....	0	0¼		
Coal, soft, columnar (slate floor)	0	5	2	1¼

Big Creek District, McDowell County.

In Big Creek District, the Douglas Coal is confined to several scattered patches in the northwest border, where it has practically the same development as in Sandy River. The following opening in the west edge of the District was examined by Gawthrop:

Coal Opening—No. 455 on Map II.

On west hillside of Little Slate Creek, 0.2 mile northeast of Opening No. 454 last described; **Douglas Coal**; elevation, 2120' B.

	Ft.	In.
Sandstone, massive.....	11	0
Slate, dark, flaggy.....	4	0
Coal, soft, columnar.....1'	0"	
Slate	0	1
Coal, soft, columnar (shale floor)	0	11
		2
		0

Browns Creek District, McDowell County.

In Browns Creek, the Douglas Coal was not observed either at prospects or outcrop, but it probably has the same development in the localities designated on Figure 20 as described for Huff Creek and Sandy River Districts, immediately adjoining this area.

Quantity of Douglas Coal Available.

Based on the evidence given on the foregoing pages and a determination of the area by interpolation between that of the Gilbert and Iaeger beds by Gawthrop, the following estimate is made for the probable amount of Douglas Coal:

Probable Amount of Douglas Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming::					
Oceana.....	2	15.00	9,600	836,352,000	33,454,080
Clear Fork.....	2	4.00	2,560	223,027,200	8,921,088
Baileysville.....	2	10.00	6,400	557,568,000	22,302,720
Huff Creek.....	2	20.00	12,800	1,115,136,000	44,605,440
Slab Fork.....	2	20.00	12,800	1,115,136,000	44,605,440
Center.....	2	7.00	4,480	390,297,600	15,611,904
Totals.....		76.00	48,640	4,237,516,800	169,500,672
McDowell:					
Sandy River....	2	80.00	51,200	4,460,544,000	178,421,760
Browns Creek..	2	5.00	3,200	278,784,000	11,151,360
Big Creek.....	2	10.00	6,400	557,568,000	22,302,720
Adkin.....	2	0.05	32	2,787,840	111,513
Totals.....		95.05	60,832	5,299,683,840	211,987,353
Totals for Both Counties		171.05	109,472	9,537,200,640	381,488,025

THE LOWER DOUGLAS COAL.

The Lower Douglas Coal, described in Chapter V, pages 184 and 185, is fairly persistent in each County, but as a minable bed it appears to be confined to the waters of Panther Creek and Dry Fork in the southwestern edge of McDowell, as shown on Figure 21. Since it belongs slightly below midway in the interval separating the Gilbert and Iaeger beds, the detailed outcrops of which are outlined on Map II, that for the Lower Douglas Coal may be readily determined in the region of its occurrence. It has never been mined commercially in the State, but it has been opened at several country banks in Sandy River District (McDowell) by natives for local domestic fuel.



Figure 21.—Showing the Approximate Movable Area of the Lower Douglas Coal (See Explanations in Author's Preface).

Oceana District, Wyoming County.

In Oceana District, the Lower Douglas Coal does not appear to attain minable dimensions, although it was recognized at crop exposures, the three following being examined by the writer:

Coal Exposure—No. 456 on Map II.

On north edge of road on Laurel Fork, 2.6 miles southeast of Oceana, and 0.3 mile southeast of Bear Branch; **Lower Douglas Coal**; elevation, 1345' B.

		Ft.	In.
Sandstone, grayish white, hard, pebbly, Lower Nuttall		60	0
Coal , soft.....	0' 4"		
Shale, gray and sandy.....	1 0		
Coal , soft.....	0 2	1	6
Shale, sandy and gray, to bed of Laurel Fork.....		10	0

One-half mile southward at **Coal Exposure No. 457 on Map II**, the Lower Douglas Coal was once mined by stripping from the bed of Laurel Fork, where Henry Stewart, a native, reports it 24 inches in thickness. Here its bed-section was concealed by water so that its thickness could not be determined.

Coal Exposure—No. 458 on Map II.

On the east hillside of Cabin Branch, 0.4 mile due north of Jesse, and 3.9 miles southeast of Oceana; **Lower Douglas Coal**; elevation, 1350' B.

		Ft.	In.
Sandstone, very hard, Lower Nuttall , visible.....		40	0
Coal , soft.....	0' 5"		
Slate, gray.....	0 1		
Coal , soft.....	0 3	0	9
Shale, dark, to bed of Branch.....		10	0

Slab Fork District, Wyoming County.

In Slab Fork District, the Lower Douglas Coal is generally thin and unimportant at its definitely recognized crop exposures, the four following having been observed by the writer:

Coal Prospect No. 459 on Map II, on north hillside of Manns Camp Branch of Trough Fork, 2.4 miles northeast of McGraw, in the Lower Douglas bed, at an elevation of 1895' B., had fallen shut, but the seam is reported thin and unimportant.

Coal Opening—No. 460 on Map II.

On west hillside of Trough Fork, 0.4 mile northeast of Prospect No. 459 above; **Lower Douglas Coal**; elevation, 2015' B.

	Ft.	In.
Sandstone, visible.....	15	0
Shale, hard, flaggy, with calamite and other plant fossils.....	3	0
Coal , hard.....0' 4"		
Coal , medium soft (slate floor).1 9	2	1

Coal Prospect—No. 461 on Map II.

On east bank, $\frac{3}{4}$ mile up Otter Fork of Laurel, 2.9 miles northeast of McGraw; **Lower Douglas Coal**; elevation, 1990' B.

	Ft.	In.
Sandstone, massive, visible, Lower Nuttall	25	0
Shale, Douglas , black, and Lingulae marine fossils abundant.....	6	0
Coal , medium soft.....	1	5
Slate and concealed to bed of Branch.....	7	0

Coal Exposure—No. 462 on Map II.

In ravine on west hillside of Franks Fork, 0.4 mile northwest of Bobs Fork, and 1.4 miles northeast of Prospect No. 461; elevation, 1990' B.

	Ft.	In.
Concealed		
Shale, Douglas , black, with Lingulae and other marine fossils abundant.....	10	0
Coal , soft, Lower Douglas (slate floor).....	0	8

Clear Fork and Baileysville Districts, Wyoming County.

In Clear Fork, no exposures of the Lower Douglas Coal were observed, but it is probably thin and worthless as in Oceana and Slab Fork Districts. In Baileysville District, this seam appears to maintain its thin and irregular bed-section as shown in the following exposure, examined by the writer:

Coal Exposure—No. 463 on Map II.

On east hillside of Shannon Mill Creek and road, 0.2 mile northwest of mouth of Lick Branch and 4 miles northeast of Baileysville; **Lower Douglas Coal**; elevation, 1565' B.

	Ft.	In.
Concealed		
Shale, dark, flaggy and sandy.....	15	0
Coal , soft (slate floor).....	1	0

Center District, Wyoming County.

In Center, the Lower Douglas Coal is present in practically the same development as in Oceana and Slab Fork Districts as shown by the two following exposures, examined by Gawthrop:

Coal Exposure—No. 464 on Map II.

On east hillside, 0.55 mile up Bee Fork of Turkey Creek, $\frac{3}{4}$ mile due west of Turkey P. O.; **Lower Douglas Coal**; elevation, 1600' B.

	Ft.	In.
Sandstone, shaly.....	5	0
Coal, medium soft.....	1	0
Shale and concealed.....	5	0
Sandstone, massive.....	15	0

The above opening comes 220 feet below another—No. 391 on Map II—in the Gilbert Coal.

About three miles northeast of Pineville at **Coal Opening No. 465 on Map II**, on the south hillside of Goode Branch of Beaverhole Fork, 0.3 mile southeast of Newfound, 26 inches of clean coal that appears to belong at the horizon of the Lower Douglas bed is reported by Silas Goode. It had fallen shut when visited by Gawthrop, but comes at an elevation of 2130' B.

Huff Creek District, Wyoming County.

In Huff Creek District, the Lower Douglas Coal thickens up somewhat above that found in the areas described above, but even here it is too much split with slate and shale to be classed as minable. The five following exposures therein were examined by Gawthrop:

Coal Exposure—No. 466 on Map II.

In bed of Little Huff Creek, 0.4 mile southeast of mouth of Buffalo Creek; **Lower Douglas Coal**; elevation, 1100' B.

Here its bed-section was concealed, but it is reported by William England, a native, 4 feet thick, including partings.

Coal Opening—No. 467 on Map II.

On west bank, 0.3 mile up Suke Creek and 0.7 mile southeast of Exposure No. 466; **Lower Douglas Coal**; elevation, 1160' B.

		Ft.	In.
Concealed			
Sandstone, flaggy, visible.....		4	0
Shale, gray.....		1	0
Coal	0' 1¼"		
Slate	0 0¼		
Coal	0 1½		
Shale, gray.....	0 2		
Coal, soft.....	1 2		
Shale, gray, silicious.....	13 0		
Coal, soft.....	0 0½		
Slate, dark.....	0 0½		
Coal, soft.....	0 2		
Slate	0 0¼		
Coal, soft.....	1 4¾		
Bone	0 2	16	5
<hr/>			
Shale and concealed to bed of Suke Creek.....		20	0

Coal Exposure—No. 468 on Map II.

On north bank of Little Huff Creek, at mouth of Pad Fork; **Lower Douglas Coal**; elevation, 1275' B.

		Ft.	In.
Shale, gray, visible.....		5	0
Coal, soft.....	0' 2"		
Shale, gray, silicious.....	9 0	10	2
Coal, soft, columnar.....	1 0		
Shale, gray, silicious.....		15	0
Shale, gray.....		30	0
Shale, dark, to level of Little Huff Creek.....		35	0

At the above crop exposure, only the lower bench of this bed, as represented at No. 468 above, is shown, the upper being concealed.

Coal Opening—No. 469 on Map II.

On north hillside of Little Huff Creek, 0.6 mile northeast of mouth of Pad Fork, 4.5 miles southwest of Baileysville; **Lower Douglas Coal**; elevation, 1285' B.

	Ft.	In.
Shale, gray, silicious.....	5	0
Coal, soft.....	1	2
Shale and concealed.....	5	0
Shale and flaggy sandstone.....	5	0
Limestone, silicious.....	0	6
Concealed, with shale.....	10	0
Shale, dark gray, silicious.....	15	0
Limestone, silicious, lenticular.....	1	0
Shale, dark, to bed of Little Huff Creek.....	15	0



PLATE XXIII—Showing Coal Prospect No. 176 on Map II (see page 388), in extreme west edge of McDowell County on the Cedar Grove ("Upper Thacker") bed.—Photo by courtesy of U. S. Geological Survey.

Coal Opening—No. 470 on Map II.

In Orchard Branch of Little Huff Creek, 0.4 mile above mouth of former, 0.6 mile northeast of No. 429; **Lower Douglas Coal**; elevation, 1470' B.

		Ft.	In.
Shale, gray.....			
Coal, soft.....	1' 0"		
Shale	0 8		
Coal, soft.....	1 4	3	0

The above section was furnished by G. A. Deskins, as the opening was closed when visited by Gawthrop.

Sandy River District, McDowell County.

In Sandy River District, the Lower Douglas Coal attains minable dimensions and regularity in the region designated on Figure 21, where it has been opened and prospected quite extensively by natives for domestic fuel. Outside this locality in the same District, the writer examined the following exposure of this bed, where it has ceased to be minable:

Coal Exposure—No. 471 on Map II.

On east bank of Panther Creek, 0.3 mile south of Panther; **Lower Douglas Coal**; elevation, 925' B.

		Ft.	In.
Coal opening (closed), Douglas (1025' B.).....			
Concealed		75	0
Sandstone, shaly and flaggy, Lower Nuttall		25	0
Shale, Douglas , bluish black, sandy, with marine fossils, <i>Lingulae</i> , abundant.....		7	0
Coal, slaty.....	0' 5"	Lower Douglas	4 2
Shale, buff, sandy.....	3 0		
Coal, slaty.....	0 1		
Shale, gray.....	0 4		
Coal, slaty.....	0 4		
Shale, gray.....		3	0
Sandstone, Panther , massive, pebbly.....			

The stratigraphic position of the Lower Douglas Coal at the above exposure is exhibited in the Panther Section published in Chapter IV, pages 88-89. The following opening was examined by Gawthrop:

Coal Opening—No. 472 on Map II.

On west bank, 0.5 mile up Trace Fork of Panther Creek, and 2.2 miles south of Panther; **Lower Douglas Coal**; elevation, 1040' B.

	Ft.	In.
Sandstone, massive, Lower Nuttall , visible.....	15	0
Coal , medium soft.....	2	0
Shale and concealed to bed of Trace Fork.....	10	0

The four following openings, in the southwest edge of Sandy River District, within the boundary of the region designated on Figure 21 as holding minable Lower Douglas Coal, were examined by the writer:

Adam Justice Coal Opening—No. 473 on Map II.

On north hillside, one-eighth mile up Arrow Branch of Slaunch Fork, 5 miles west of Beartown; **Lower Douglas Coal**; elevation, 1350' B.

	Ft.	In.
Concealed		
Shale, bluish gray, sandy, plant fossils abundant..	4	0
Coal , soft.....0' 1¾"		
Slate, black, 9" to.....0 0¼		
Coal , soft (slate floor).....2 5	2	7

Coal Opening—No. 474 on Map II.

On west hillside of Slaunch Fork of Panther, ¼ mile south of mouth of Arrow Branch; **Lower Douglas Coal**; elevation, 1380' B.

	Ft.	In.
Concealed		
Shale, sandy.....	8	0
Coal , slaty.....0' 4 "		
Shale, gray.....0 1½		
Coal , soft.....2 5	2	10½
Slate and concealed.....	5	0
Sandstone, making great cliff, Panther		

A. Spurlock Coal Opening—No. 475 on Map II.

On north side of run on west side of Slaunch Fork, 1 mile southwest of Opening No. 474 above; **Lower Douglas Coal**; elevation, 1390' B.

	Ft.	In.
Concealed		
Shale, sandy.....	10	0

		Ft.	In.
Coal, soft, 0" to.....	0' 1"		
Shale, bluish gray, 10" to.....	1 3		
Coal, soft.....	1 4		
Slate, gray, 1/8" to.....	0 1		
Coal, soft.....	0 7	3	4
<hr/>			
Shale		4	0
Sandstone, Panther , massive, forms great cliffs			
along Slaunch Fork.....			

Coal Prospect No. 476 on Map II, located on the southwest hillside of Slaunch Fork, 2.3 miles northwest of Paynesville, had fallen shut when visited by the writer in 1914, but the Lower Douglas Coal is reported here to be about 3 feet in thickness. Its stratigraphic position at this digging is exhibited in the Paynesville—2.5 Miles Northeast Section, given in Chapter IV, pages 101-2. The six following openings in this seam, in Sandy River District, were examined by Gawthrop:

Coal Opening—No. 477 on Map II.

On east hillside of Meathouse Fork of Panther, 1/4 mile southeast of mouth of Desolate Branch, just east of residence of Rev. Wm. Estep; **Lower Douglas Coal**; elevation, 1535' B.

		Ft.	In.
Concealed			
Shale, bluish gray, silicious.....		10	0
Coal, soft, columnar.....	2' 0 1/2"		
Shale, gray.....	0 0 1/2		
Coal, soft, columnar.....	0 4	2	5
<hr/>			
Shale and concealed.....		5	0
Sandstone, massive, visible.....		15	0

Coal Prospect—No. 478 on Map II.

On east hillside of Meathouse Fork, just northeast of mouth of Birchlick, 3.6 miles northwest of Bradshaw; **Lower Douglas Coal**; elevation, 1620' B.

		Ft.	In.
Concealed and shale.....			
Coal, soft.....	2' 1 1/2"		
Shale	0 0 1/2		
Coal, soft.....	0 1 1/2		
Slate	0 0 1/2		
Coal (slate floor and concealed).....	0 2	2	6

Coal Opening—No. 479 on Map II.

In ravine, north side, 0.5 mile up Birchlick Branch of Meathouse Fork, 0.5 mile east of Opening No. 478; **Lower Douglas Coal**; elevation, 1675' B.

		Ft.	In.
Concealed			
Sandstone, shaly.....		5	0
Shale, bluish gray.....		5	0
Coal, soft, columnar.....	2' 3½"		
Fire clay, soft.....	0 0½		
Coal, soft, columnar.....	0 2	2	6
<hr/>			
Shale and concealed.....			

Coal Prospect—No. 480 on Map II.

In drain on branch of Meathouse Fork, 1.9 miles northeast of Paynesville, 3.8 miles west of Bradshaw; **Lower Douglas Coal**; elevation, 1680' B.

		Ft.	In.
Shale, gray, silicious, visible.....		4	0
Coal	1' 2 "		
Slate	0 1		
Coal, soft.....	0 5		
Slate	0 0½		
Coal	0 3½	2	0
<hr/>			
Slate and concealed.....		10	0
Sandstone, massive, visible.....		15	0

In the same locality its thickness is shown in the Coal-bank Fork Section given in Chapter VI, page 169.

Coal Opening—No. 481 on Map II.

On head of Horse Creek, 2.6 miles northwest of Ritter (Avondale); **Lower Douglas Coal**; elevation, 1400' B.

		Ft.	In.
Sandstone, massive.....		5	0
Shale, silicious.....		1	0
Coal	1' 2"		
Bone, 0" to.....	0 1		
Coal, soft.....	0 4		
Coal, bony.....	0 3	1	10
<hr/>			
Shale and concealed.....			

The above opening is near the boundary of the region indicated on Figure 21 as holding this bed in minable thickness.

Coal Opening—No. 482 on Map II.

On the north hillside of Grapevine Branch, 1.6 miles southwest of Ritter (Avondale); **Lower Douglas Coal**; elevation, 1640' B.

	Ft.	In.
Coal, Douglas, at Opening No. 445 on Map II.....	2	5
Concealed, with sandstone.....	130	0
Sandstone, massive.....	10	0
Coal, medium soft, columnar...1' 7"		
Slate	0	3
Coal, medium soft, columnar...0 4	2	2

Shale and concealed.....

The following opening was examined by the writer:

Coal Opening—No. 483 on Map II.

On south bank of Beartown Branch of Dry Fork, 1.5 miles due west of Beartown; **Lower Douglas Coal**; elevation, 1550' B.

	Ft.	In.
Sandstone, massive.....	15	0
Coal, soft, 0" to.....0' 3"		
Slate, sandy, hard.....	0	10
Coal, medium soft (slate floor).2 6	3	7

The four following openings on the waters of Oozley Branch and Bradshaw Creek, all in Sandy River District, were examined by Gawthrop:

Coal Opening—No. 484 on Map II.

On west hillside of Bradshaw Creek, 0.3 mile west of Bradshaw; **Lower Douglas Coal**; elevation, 1850' B.

	Ft.	In.
Concealed		
Shale, bluish gray, silicious.....	10	0
Coal, soft.....0' 3½"		
Slate, black.....	0	1
Coal, medium soft, columnar..1 0		
Coal, softer.....	0	6
Coal, harder.....	0	10
Slate, 0" to.....	0	0¼
Coal, medium soft, columnar..1 3½	4	0¼
Slate and concealed.....	1	0
Sandstone, massive, visible, Panther	40	0

Coal Opening—No. 485 on Map II.

On head of Oozley Branch, 0.4 mile southeast of school house, 1.4 miles due west of Bradshaw; **Lower Douglas Coal**; elevation, 1840' B.

		Ft.	In.
Concealed and sandstone.....			
Shale, bluish gray.....		10	0
Coal, soft, columnar.....	0' 3"		
Slate, black, hard.....	0 1		
Coal, soft.....	0 2		
Slate, black.....	0 0½		
Coal, medium soft, columnar..	0 10		
Coal, soft, columnar.....	0 7		
Slate, ¼" to.....	0 0		
Coal, soft (slate floor).....	0 11½	2	11

Coal Opening—No. 486 on Map II.

On head of Groundhog Branch of Bradshaw Creek, 0.5 mile southwest of Opening No. 485 above; **Lower Douglas Coal**; elevation, 1830' B.

		Ft.	In.
Concealed			
Shale, bluish gray.....		6	0
Coal, soft.....	0' 3½"		
Shale, gray.....	0 2½		
Coal, medium soft.....	0 9		
Coal, softer.....	0 7		
Slate, 0" to.....	0 0¼		
Coal, soft, columnar.....	1 0		
Slate, coaly.....	0 3		
Coal (shale floor and concealed).....	0 6	3	7¼

Coal Opening—No. 487 on Map II.

On north hillside of Bradshaw Creek, just below and nearly opposite mouth of Turkey Branch; **Lower Douglas Coal**; elevation, 1810' B.

		Ft.	In.
Sandstone, massive, visible.....		10	0
Coal, soft, columnar.....	2' 1"		
Fire clay shale.....	1 0		
Coal, soft, columnar.....	0 4		
Slate	0 1		
Coal (slate floor).....	0 2	3	8

The thickness and stratigraphic position of the Lower Douglas seam at **Coal Exposure No. 488 on Map II**, located

on the hill road on the head of Bradshaw Creek, are given in the Paynesville—2 miles Northeast Section, Chapter IV, pages 101-2.

At **Coal Opening No. 489 on Map II**, located on the north hillside of Groundhog Branch, 1.5 miles southwest of Bradshaw, and 0.6 mile northwest of the mouth of the Branch, the thickness and bed-structure of the Lower Douglas Coal are exhibited in the Groundhog Branch Section published in Chapter V, page 99.

The following digging was examined by the writer:

Coal Opening—No. 489A on Map II.

On east hillside of Middle Fork of Bradshaw Creek, 1.3 miles northwest of Height P. O.; **Lower Douglas Coal**; elevation, 2040' B.

	Ft.	In.
Sandstone, visible.....	6	0
Coal, medium soft.....0'	3"	
Coal, soft, columnar (slate floor).2	0	3

The above may represent the Douglas bed, but its elevation when compared to that of the undoubted Iaeger seam at Opening No. 533 on Map II, 0.4 mile northeastward, appears to favor the Lower Douglas correlation.

Browns Creek District, McDowell County.

In Browns Creek District, the Lower Douglas Coal is confined to practically the same region as that outlined on Figure 20 for the Douglas bed, but here it does not appear to attain minable dimensions and purity, possessing a development probably similar to that described for the immediately adjoining portion of Huff Creek District. No exposures of the coal were observed in Browns Creek District.

Big Creek District, McDowell County.

In Big Creek District, the Lower Douglas Coal is confined to several scattered patches along the western border. The three following exposures, in this region, and just across the State Line in Virginia, were examined by the writer:

Coal Opening No. 490 on Map II, in Virginia, 0.3 mile southwest of the summit of Bearwallow Knob, at an elevation of 2760' B., had fallen shut when visited in 1914, so that its bed-section was not obtained. Here, it belongs just above the Panther ("Dismal") Conglomerate.

Coal Exposure—No. 491 on Map II.

In ridge road, about 100 yards north of Bearwallow, Virginia, and one mile southeast of summit of Bearwallow Knob; **Lower Douglas Coal**; elevation, 2880' B.

	Ft.	In.
Sandstone, Lower Nuttall , coarse, brown, friable, visible.....	30	0
Shale, dark, Douglas	20	0
Coal blossom , heavy, Lower Douglas , 2' to.....	3	0
Shale and concealed, 5' to.....	10	0
Sandstone, Panther ("Dismal").....		

Coal Exposure No. 492 on Map II, in ridge road on State Line, 1.5 miles southeast of summit of Bearwallow Knob, at an elevation of 3030' B., is in the Lower Douglas bed. Only 10 inches of coal is visible here, directly below 5 feet of black shale (Douglas), and less than 10 feet above the great Panther ("Dismal") Conglomerate or topmost member of the Bearwallow Knob—2 Miles East Section, published in Chapter IV, pages 119-121.

Quantity of Lower Douglas Coal Available.

Based on the foregoing data and a determination of its area as indicated on Figure 21 by interpolation between that of the Douglas and Iaeger beds by Gawthrop, the following estimate is made for the probable amount of Lower Douglas Coal:

Probable Amount of Lower Douglas Coal.

McDowell County by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet Of Coal.	Short Tons of Coal.
Sandy River.....	2	40.00	25,600	2,230,272,000	89,210,880
Big Creek.....	2	8.00	5,120	446,054,400	17,842,176
Totals.....		48.00	30,720	2,676,326,400	107,053,056

THE IAEGER COAL.

The Iaeger Coal, described briefly in Chapter VI, pages 189-90, attains minable dimensions and is of secondary importance in Wyoming and McDowell. Its minable area is indicated on Figure 22, as also its approximate western boundary line, west of which it has apparently thinned below minable dimensions—18 inches. Its detailed outcrop is outlined on Map II. It has been opened and prospected by natives for local domestic fuel in each County. Its character at these diggings and crop exposures will now be described by magisterial Districts.

Oceana District, Wyoming County.

In Oceana District, the Iaeger Coal does not appear to attain minable dimensions and purity, except on the east side of Laurel Fork, above mouth of Acord Branch, as shown by the five following exposures, examined by Gawthrop:

Coal Exposure—No. 493 on Map II.

At edge of road on south bank of Laurel Fork at Jesse, 4 miles southeast of Oceana; **laeger Coal**; elevation, 1360' B.

	Ft.	In.
Concealed		
Coal , soft.....	1	2
Sandstone, massive, Middle laeger , to bed of Laurel Fork.....	15	0

Coal Exposure—No. 494 on Map II.

On east hillside of Elkins Branch of Laurel, 0.8 mile southeast of Jesse; **laeger Coal**; elevation, 1474' B.

	Ft.	In.
Concealed, with shale.....		
Coal , soft.....	0	9
Fire clay shale.....	3	0
Sandstone, massive, visible.....	8	0

Coal Opening—No. 495 on Map II.

On south side, 0.35 mile up Cloverlick Branch of Laurel, 2.2 miles northeast of Jesse; **laeger Coal**; elevation, 1470' B.

		Ft.	In.
Shale, gray, silicious.....		10	0
Coal, cannel.....	2' 0"		
Coal, soft.....	1 0	3	0

The above opening was closed, the section being furnished by W. R. Allen, a native.

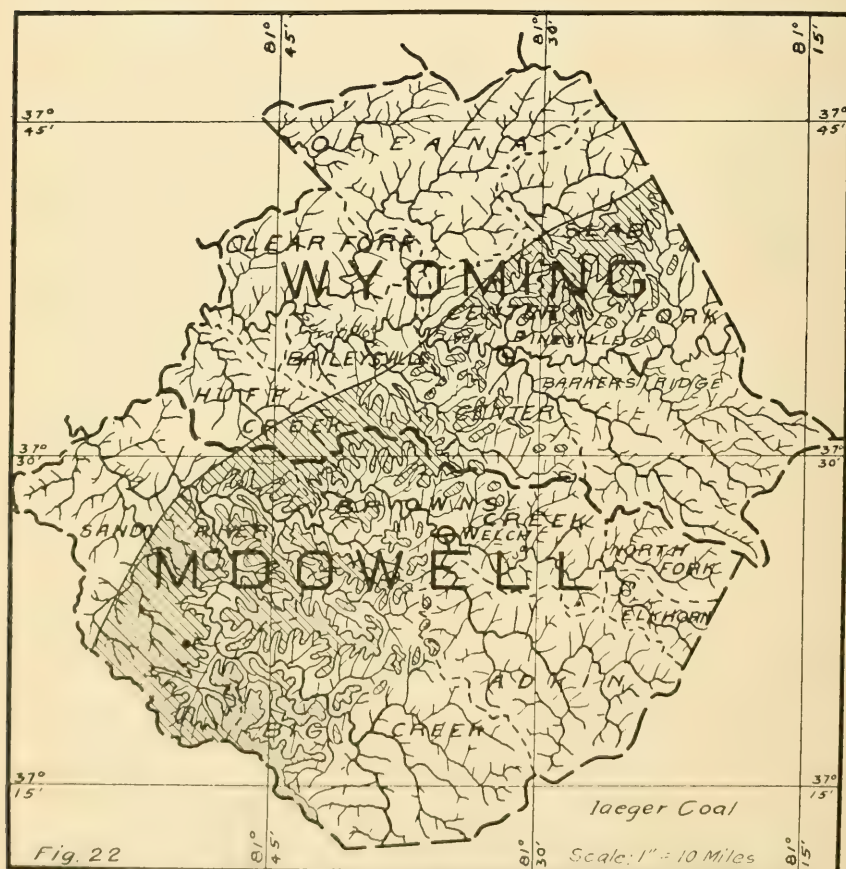


Figure 22.—Showing Approximate Movable Area of the laeger Coal (See explanations in Author's Preface).

Coal Opening—No. 496 on Map II.

On south bank of Laurel Fork, opposite mouth of John O Branch, 2.3 miles northeast of Jesse; **laeger Coal**; elevation, 1400' B.

	Ft.	In.
Sandstone, massive.....	5	0
Shale, gray.....	4	0
Coal, cannel.....1' 2"		
Coal, soft, columnar.....1 2	2	4
<hr/>		
Shale and concealed to run.....	15	0

Coal Opening—No. 497 on Map II.

On west bank, 0.6 mile up Left Fork of Acord Branch, 1.8 miles southeast of Jesse; **laeger Coal**; elevation, 1585' B.

	Ft.	In.
Coal, reported by native, opening closed.....	1	6

Slab Fork District, Wyoming County.

In Slab Fork District, the **Iaeger Coal** has been opened at country banks at several points by natives for local domestic fuel, as shown by the eight following exposures, examined by Gawthrop:

Coal Opening—No. 498 on Map II.

On south hillside, 0.6 mile up Glen Fork, and 2 miles due west of McGraw; **laeger Coal**; elevation, 1715' B.

	Ft.	In.
Coal, soft, columnar.....1' 3"		
Shale, gray.....0 8		
Coal, soft.....0 3		
Coal, bony.....0 4		
Coal, soft (shale floor and concealed).....1 1	3	7

Ritter Lumber Co. Coal Opening—No. 499 on Map II.

On branch of Laurel Branch, 2.8 miles south of McGraw and 2 miles northwest of Saulsville; **laeger Coal**; elevation, 1980' B.

	Ft.	In.
Sandstone, shaly, visible.....	10	0
Coal, bony.....0' 3"		
Coal, soft, columnar.....1 5		
Shale, gray.....0 10		
Coal, soft, columnar.....0 6	3	0
<hr/>		
Shale and concealed.....	10	0
Sandstone, massive.....		

Coal Opening—No. 500 on Map II.

On head of Laurel Branch, 0.6 mile south of Opening No. 499 above and 0.9 mile northeast of Castle; **laeger Coal**; elevation, 1975' B.

		Ft.	In.
Sandstone, massive.....		8	0
Coal, soft, weathered.....	0' 1"		
Coal, soft, columnar (shale floor).....	1 8	1	9

The above opening had fallen shut, the section given being furnished by a native.

At **Opening No. 501 on Map II**, located on the east edge of road, 0.2 mile north of Low Gap, and 2.9 miles southeast of McGraw, at an elevation of 1960' B., the **Iaeger Coal** is 16 inches in thickness.

W. R. Shumate Coal Opening—No. 502 on Map II.

On southwest hillside of a branch of Marsh Fork, 0.4 mile northeast of Saulsville; **laeger Coal**; elevation, 2025' B.

	Ft.	In.
Sandstone, flaggy, visible.....	5	0
Coal, soft (floor, shale and concealed).....	1	7

Coal Opening—No. 503 on Map II.

In drain, 0.9 mile northeast of Saulsville and 0.5 mile due east of Opening No. 502 above; **laeger Coal**; elevation, 2050' B.

		Ft.	In.
Sandstone, massive, visible.....		5	0
Coal, soft.....	1' 5½"		
Bone	0 6½"		
Coal, medium soft (shale floor).....	0 5	2	5

The above section is very similar to that of the **Iaeger** bed at its type locality, in that a bony coal often divides the seam into two unequal benches, the upper bench being more than double that of the lower in thickness.

Coal Opening—No. 26 on Map II.

On branch of Black Fork, 0.5 mile northeast of Hickory Knob and 2.8 miles west of Mabon; **laeger Coal**; elevation, 2095' B.

		Ft.	In.
1. Sandstone, massive, visible.....		5	0
2. Coal, medium soft, high in sulphur.....	0' 9"		
3. Bone, 0" to.....	0	1	
4. Coal, soft, columnar.....	0	9	
5. Bone, hard.....	0	8	
6. Coal, soft, columnar (slate floor).....	0 7	2	10

Gawthrop collected a sample for analysis at the above opening from Nos. 2, 4 and 6 of the section, the composition of which is published under **No. 26** in the table of coal analyses at the end of this Chapter.

At **Coal Exposure—No. 504 on Map II**, located in hill road on east hillside of Black Fork, 2.1 miles west of Mabon, at an elevation of 2200' B., 18 inches of the **laeger** bed is visible.

Baileysville District, Wyoming County.

In Baileysville District, the **laeger Coal** as a minable seam is confined to the southeastern point as shown on Figure 22. It has not been prospected so extensively here as in Slab Fork. The two following exposures were examined by the writer:

Coal Exposure—No. 505 on Map II.

On south hillside of Guyandot River, 0.7 mile southwest of Baileysville; **laeger Coal**; elevation, 1150' B.

	Ft.	In.
Sandstone, massive, Upper laeger	35	0
Concealed	12	0
Coal, laeger	1	0
Shale, sandy.....	5	0
Sandstone, flaggy, Middle laeger , to road.....	10	0
Concealed to river bed.....	15	0

It is only 12 inches in thickness at **Coal Exposure No. 506** on Map II, in the bed of David Branch, 0.4 mile north of Baileysville, at an elevation of 1200' B. The two following were examined by Gawthrop:

Coal Opening—No. 507 on Map II.

On head of Trace Fork of Brier Creek, 1.5 miles southward from Brier P. O.; **laeger Coal**; elevation, 1530' B.

		Ft.	In.
Sandstone, flaggy, visible.....		5	0
Coal , soft, columnar, with sulphur streaks.....	1' 6 "		
Shale, dark gray.....	0 4		
Coal, soft, slaty.....	0 3		
Slate, black.....	0 0½		
Coal , soft.....	0 6		
Slate, 0" to.....	0 0½		
Coal , soft (shale floor).....	0 7	3	3

At the **W. G. Morgan Coal Opening—No. 508 on Map II**, located on the west hillside of Brier Creek, 0.8 mile south of mouth of Marsh Fork, and 4 miles southeast of Baileysville, at an elevation of 1690' B., the **laeger Coal** is reported 3½ feet in thickness, with 6 inches of slate below middle. The following exposure was examined by the writer:

Coal Exposure—No. 517 on Map II.

In hill road on head of Brier Creek, 0.2 mile southwest of Boring 29 on Map II; **laeger Coal**; elevation, 1825' B.

	Ft.	In.
Shale, Upper laeger , from low gap.....	13	0
Coal , soft, laeger , (1825' B.).....	1	6
Sandstone, Middle laeger	30	0
Shale, sandy, dark.....	14	6
Coal , Lower laeger	0	5
Sandstone, shaly, Lower laeger	20	0

Center District, Wyoming County.

In Center District, the **laeger Coal** has been opened at country banks at several points for local domestic fuel. The two following exposures were examined by the writer:

Coal Opening—No. 509 on Map II.

On waters of Righthand Fork of Skin Fork, 1 mile northwest of Pineville; **laeger Coal**; elevation, 1975' B.

		Ft.	In.
Sandstone			
Coal , soft, columnar.....	1' 5"		
Slate, dark gray, coal streaks...	0 5		
Coal , soft (slate floor).....	0 7	2	5

The above section is typical of this bed at Iaeger, McDowell County. Its thickness and stratigraphic position at **Coal Exposure No. 510 on Map II**, in the road, 0.3 mile east of Opening No. 509, last described, is published in the Pineville-Williamson Branch Section, in Chapter VI, pages 174-5.

Coal Opening—No. 511 on Map II.

On southeast hillside, 0.7 mile up Whiteoak Fork of Rockcastle Creek, 0.5 mile northwest of Castle P. O.; **laeger Coal**; elevation, 1985' B.

			Ft.	In.
Sandstone, rotten, shaly.....				
Bone	0'	3 "		
Coal, medium soft.....	1	0		
Mother coal.....	0	0 1/4		
Coal, medium soft.....	0	5 3/4		
Coal, bony (shale floor).....	0	4	2	1

Coal Opening—No. 512 on Map II.

On north hillside at Castle P. O., 0.3 mile southeast of Opening No. 511 above; **laeger Coal**; elevation, 1990' B.

			Ft.	In.
Shale, dark, silicious.....				
Coal, hard, bony.....	0'	5"		
Coal, medium soft.....	1	5		
Coal, bony (shale floor).....	0	5	2	3

Coal Opening—No. 513 on Map II.

On south hillside, 0.3 mile southeast of Castle and 1.9 miles southwest of Saulsville; **laeger Coal**; elevation, 1985' B.

			Ft.	In.
Shale, dark, silicious, visible.....			2	0
Coal, hard, high in sulphur.....	0'	7"		
Coal, soft.....	1	3		
Coal, hard, bony (shale floor).....	0	6	2	4

Wilbur Gunter Coal Opening—No. 514 on Map II.

On west hillside of Bearhole Fork, 0.8 mile southwest of Wolf Gap; **laeger Coal**; elevation, 1995' B.

			Ft.	In.
Sandstone, flaggy, visible.....			5	0
Shale, with plant fossils.....			1	0
Coal, soft (shale floor).....			1	6

At **Coal Prospect No. 515 on Map II**, on the east hillside of Bearhole Fork, 0.4 mile southwest of Wolf Gap, at an elevation of 2035' B., the Iaeger Coal is only 14 inches in thickness.

Huff Creek District, Wyoming County.

In Huff Creek District, the Iaeger Coal as a minable seam is confined to the southeast portion, as exhibited on Figure 22. No outcrops of this bed were observed in that locality; however, the following exposure, examined by Gawthrop, is in a region where it has thinned below minable dimensions:

Coal Exposure—No. 516 on Map II.

On north bank, 0.9 mile up Pad Fork of Little Huff Creek; **Iaeger Coal**; elevation, 1275' B.

	Ft.	In.
Sandstone, massive, visible.....	2	0
Shale, silicious.....	0	6
Coal, soft (shale floor).....	0	11

Sandy River District, McDowell County.

In Sandy River District, the Iaeger Coal has long been mined at country banks by natives for local domestic fuel, especially in the immediate vicinity of Iaeger, the town from which it received its name. The three following exposures of this bed just before it passes below Tug Fork on the rapid northwest dip of the strata were examined by the writer:

Coal Exposure—No. 518 on Map II.

In railway cut, 1.3 miles northwest of Iaeger, nearly opposite mouth of Orchard Branch; **Iaeger Coal**; elevation, 980' B.

	Ft.	In.
Shale, Upper Iaeger , dark gray, laminated.....	40	0
Coal, soft.....	1	0
Sandstone, massive, Middle Iaeger , to N. & W. Ry. grade.....	20	0

The above is the farthest west exposure of this bed observed along the valley of Tug Fork, and it is shown here thinned below minable dimensions.

Coal Exposure—No. 519 on Map II.

Flush with N. & W. Ry. grade, 0.4 mile west of mouth of Johnnycake Branch, and 1.1 miles northwest of Iaeger; **laeger Coal**; elevation, 965' B.

	Ft.	In.
Shale, Upper laeger , dark, visible,.....	12	0
Sandstone, shaly.....	6	0
Coal , soft, columnar.....1' 9 "		
Slate, black.....0 1½		
Coal , soft (slate floor).....0 5½	2	4

The above opening is only about 150 yards southeast of No. 518 above, the bed having dropped about 15 feet in elevation on a strictly local reversal of the general northwest dip of the rocks in this region.

Coal Exposure—No. 520 on Map II.

In edge of road, northwest bank of Johnnycake Branch, 1 mile northwest of Iaeger; **laeger Coal**; elevation, 1010' B.

	Ft.	In.
Shale, dark gray, visible.....	1	0
Coal , soft.....1' 10"		
Shale, dark gray.....0 2		
Coal , soft.....0 8	2	8
Fire clay shale.....	7	0
Sandstone, Middle laeger		

At **Coal Exposure No. 521 on Map II**, located 0.4 mile northwest of Iaeger, the bed-structure and stratigraphic position of the Iaeger Coal are exhibited in the Iaeger—0.4 Mile Northwest Section, published in Chapter VI, page 176.

The writer collected a sample for analysis and obtained the following data at a country bank in this bed:

Coal Opening—No. 27 on Map II.

On the south hillside of Tug Fork at Iaeger, ¼ mile northeast of mouth of Dry Fork; **laeger Coal**; elevation, 1085' B.

	Ft.	In.
1. Shale, dark gray, sandy, plant fossils abundant, calamites and ferns.....	6	0
2. Coal , soft.....1' 10"		
3. Bone, 1" to.....0 3		
4. Coal , soft (slate floor).....0 3	2	4

The composition of the sample from No. 3 only of the above section is published under **No. 27** in the table of coal analyses at the end of this Chapter. This bank furnishes considerable domestic fuel for the town of Iaeger, yielding, as the analysis shows, a very high grade fuel. The three following openings in the same general region of Sandy River District, were examined by the writer:

Coal Opening—No. 522 on Map II.

On the east hillside of Dry Fork, opposite mouth of Coon Branch, 0.4 mile south of Iaeger; **Iaeger Coal**; elevation, 1080' B.

		Ft.	In.
Shale, Upper Iaeger			
Sandstone		5	0
Sandstone, shaly.....		20	0
Coal, soft	1' 9"		
Bone	0 3		
Coal, medium soft (slate floor)	1 0	3	0

Coal Opening No. 523 on Map II, on the south hillside of Tug Fork, 0.8 mile northeast of the mouth of Dry Fork, is in the Iaeger bed, at an elevation of 1110' B. The digging was closed so that its section here was not obtained.

Coal Opening—No. 524 on Map II.

On east hillside, 0.4 mile up Lick Branch, 1 mile northeast of Iaeger; **Iaeger Coal**; elevation, 1110' B.

		Ft.	In.
Shale, dark, sandy.....		4	0
Coal	0' 1"		
Slate	0 1		
Coal, soft	1 4		
Bone	0 2		
Coal, soft (slate floor)	0 3	1	11

The same bed is opened on the west hillside of Lick Branch, 0.1 mile northwest of Opening No. 524, last described, but the digging had fallen shut so that a section could not be obtained.

The thickness and stratigraphic position of the Iaeger bed at **Coal Prospects Nos. 525 and 526 on Map II**, 1.5 miles eastward from Iaeger, and 0.9 mile northwest from Wilmore, are

exhibited in the Harman Branch and Wilmore Sections, published in Chapters IV and VI, pages 93 and 175-6, respectively.

Southwestward on the waters of Panther Creek, the Iaeger Coal appears to attain its best development in the territory of this Report, as shown by the logs of Coal Test Borings Nos. 33, 35 and 36 on Map II, and the Coalbank Fork Section, published on pages 294, 294, 294, and 169, respectively. The following exposure in the same District, near the western margin of its minable area as outlined on Figure 22, was examined by Gawthrop:

Coal Exposure—No. 527 on Map II.

On east bank of Panther, 4 miles southwest of Iaeger and 0.1 mile below mouth of Hurricane Branch; **Iaeger Coal**; elevation, 1150' B.

	Ft.	In.
Sandstone, massive, visible.....	10	0
Coal, medium soft.....1' 11"		
Bone (sandstone floor).....0 3	2	2

That this exposure is near the western minable limit of the Iaeger Coal is evidenced by the fact that only 100 feet away the bed is split up with sandstone with only a few inches of coal in each layer, according to Gawthrop. On the same waters, the following exposure was examined by Gawthrop:

Coal Exposure—No. 528 on Map II.

On east bank of Meathouse Fork, 0.45 mile southward from mouth of Birchlick; **Iaeger Coal**; elevation, 1510' B.

	Ft.	In.
Sandstone, massive, visible.....	10	0
Coal, soft.....1' 6 "		
Bone, ¼" to.....0 0½		
Coal, medium soft.....0 5½	2	0
Shale	1	0
Sandstone, to bed of Westhouse Fork.....	2	0

From the foregoing section it appears that the thicknesses given for the Iaeger Coal in the logs of the borings last mentioned may be excessive, since these were sunk with a churn drill, unless the seam at Exposure No. 528 should happen to

represent the Iaeger "B" bed, a suggestion that is very probable, as will appear from an examination of the Coalbank Fork Section, page 169.

In the same District, on the waters of Dry Fork, the Iaeger Coal was once opened along the incline to Mine No. 25 on Map II of the Lone Jack Coal Mining Co. in the Douglas bed, 1.3 miles southeast of Iaeger, its thickness and stratigraphic position at this point being shown in the Iaeger—1¼ Miles Southeast Section, pages 177-8. On the head of Bradshaw Creek, Gawthrop examined the following digging:

Coal Opening—No. 529 on Map II.

On north side of Bradshaw Creek, 1¾ miles eastward from Paynesville; **Iaeger Coal**; elevation, 1670' B.

		Ft.	In.
Shale, gray, silicious, visible.....		10	0
Coal, medium soft, columnar.....	2' 3"		
Slate	0 0½		
Coal	0 2½		
Shale	0 2		
Slate, coaly.....	0 1		
Shale	0 3		
Coal, soft.....	1 0		
Coal, concealed by water (shale floor).....	0 6	4	6

The above undoubtedly represents the Iaeger bed, since not only is its bed section typical, but its stratigraphic position is also corroborated by the Paynesville—2 Miles Northeast Section, pages 101-2, thus strengthening the suggestion above under the description of Exposure No. 528. The three following openings, on the waters of Bradshaw Creek in Sandy River District, were examined by the writer:

Coal Opening—No. 530 on Map II.

On southeast hillside, 1.4 miles up Wolfpen Branch of Bradshaw Creek, 2.9 miles southeast of Paynesville; **Iaeger Coal**; elevation, 1740' B.

		Ft.	In.
Sandstone, visible.....		5	0
Shale, buff, sandy, plant fossils abundant.....		4	0
Coal, soft.....	2' 1"		
Bone	0 3		
Shale, gray.....	0 2		
Coal, soft.....	1 0		
Slate, dark gray.....	0 3		
Coal, (slate floor).....	0 3	4	0

Coal Opening—No. 531 on Map II.

On west hillside, $1\frac{1}{4}$ miles up Middle Fork of Hite Fork of Bradshaw Creek; **laeger Coal**; elevation, 1795' B.

		Ft.	In.
Sandstone, visible.....		17	0
Slate, 0" to.....		0	1
Coal , soft.....	1' 4"		
Bone	0 3		
Coal , soft.....	0 6		
Bone	0 4		
Coal , soft (slate floor).....	0 7	3	0

Coal Opening No. 532 on Map II, in the **laeger** bed, on the southeast hillside of Middle Fork, 0.5 mile southwest of Opening No. 531, last described, at an elevation of 1790' B., was closed, so a section could not be obtained. The two following openings on the waters of Bradshaw Creek were examined by Gawthrop:

Coal Prospect—No. 533 on Map II.

On the west branch of Dry Monday, 0.5 mile southeast of Opening No. 531 above; **laeger Coal**; elevation, 1830' B.

		Ft.	In.
Shale, bluish gray.....			
Coal , soft.....	1' 4"		
Bone and slate.....	0 7		
Coal , soft (fire clay shale floor).1	1	3	0

Coal Opening—No. 534 on Map II.

On branch of Hite Fork, 0.3 mile west of Big Creek District Line, 1.6 miles north of Peapatch P. O.; **laeger Coal**; elevation, 1950' B.

		Ft.	In.
Shale, gray.....			
Coal , soft.....	1' 7"		
Bone and slate.....	0 6		
Coal , soft.....	0 4	2	5

The above digging was closed, the section being furnished by a native.

Big Creek District, McDowell County.

In Big Creek, the Iaeger Coal is confined to several scattered patches near the ridge summits in the northwest portion of the District. No exposures of the bed were observed either at prospects or at outcrop, but it is evidently present in minable dimensions in the localities designated on Figure 22, as shown in the following opening on it in the edge of Virginia, slightly over a mile southeast of the summit of Bearwallow Knob, and a much less distance northeast of Bearwallow P. O.:

Coal Opening—No. 535 on Map II.

			Ft.	In.
Slate				
Coal, soft.....	2'	3"		
Bony slate.....	0	2		
Coal, soft.....	0	7		
Slate, gray.....	0	3		
Coal, soft.....	1	2		
Slate, gray.....	0	4	Iaeger Coal	
Coal, slaty (slate floor).....	0	11	(2630' B.)	5 8

Browns Creek District, McDowell County.

In Browns Creek, the Iaeger Coal is confined to several scattered patches near the ridge and mountain summits in the northwest portion of the District. No exposures on it were observed either at prospects or outcrop, but it probably occurs in practically the same development as described on preceding pages of this Chapter for the immediately adjoining portions of Sandy River and Baileysville Districts.

Quantity of Iaeger Coal Available.

Based on the foregoing evidence and a planimetric determination from Map II of its approximate minable area by Gawthrop, as outlined on Figure 22, the following estimate is made for the probable amount of Iaeger Coal:

Probable Amount of Iaeger Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet Of Coal.	Short Tons of Coal.
Wyoming:					
Baileysville	1.5	6.00	3,840	250,905,600	10,036,224
Huff Creek.....	1.5	10.00	6,400	418,176,000	16,727,040
Slab Fork.....	1.5	15.00	9,600	627,264,000	25,090,560
Center	1.5	14.00	8,960	585,446,400	23,417,856
Totals.....	.....	45.00	28,800	1,881,792,000	75,271,680
McDowell:					
Sandy River....	2	90.00	57,600	5,018,112,000	200,724,480
Browns Creek...	2	14.00	8,960	780,595,200	31,223,808
Big Creek.....	2	26.00	16,640	1,449,676,800	57,987,072
Adkin	2	0.15	96	8,363,520	334,540
Totals.....	.....	130.15	83,296	7,256,747,520	290,269,900
Totals for Both Counties..		175.15	112096	9,138,539,520	365,541,580

THE SEWELL "B" COAL.

The Sewell "B" Coal, described briefly in Chapter VI, pages 195-6, attains minable dimensions and purity in the southeast portion of each County, as shown on Figure 5, page 376, along with that for the No. 5 Block bed, as also its approximate western boundary line, west of which it appears to thin below minable dimensions. As mentioned on the pages last cited, it was erroneously correlated in former State Reports with the Iaeger bed, 200 to 250 feet higher in the measures. It has never been mined commercially in the State, but it has been opened quite extensively at country banks in Wyoming County by natives for local domestic fuel, where it compares favorably with the Sewell ("Davy") Coal, 100 feet lower in the rock column. Its thickness and character at these diggings and crop exposures will now be described by magisterial districts.

Slab Fork District, Wyoming County.

In Slab Fork District, the approximate minable area of the Sewell "B" Coal is confined to a small area northeastward from Mullens as shown on Figure 5. The following, exam-

ined by Gawthrop, is the only exposure of this bed definitely recognized in the District, in a region where it has thinned below minable dimensions:

Coal Exposure—No. 536 on Map II.

In Lumber Railway cut on Marsh Fork, 1.9 miles northwest of Maben; **Sewell "B" Coal**; elevation, 1880' B.

	Ft.	In.
Sandstone, visible, Guyandot	2	0
Shale, dark.....	4	0
Coal , soft.....	0	7
Shale, dark, silicious, to railway grade.....	5	0

Center District, Wyoming County.

In Center District, the Sewell "B" Coal has been prospected at several points by natives and large land holding companies. The five following diggings were examined by Gawthrop:

Coal Opening No. 537 on Map II, on the east hillside, 0.6 mile northeast of the mouth of Whiteoak Branch of Indian Creek, and $4\frac{3}{4}$ miles due south of Pineville, in the Sewell "B" bed at an elevation of 1900' B., had fallen shut in 1914, but the seam is reported 4 feet in thickness with a shale parting. The same is true at **Coal Opening No. 538 on Map II**, $\frac{1}{4}$ mile southeast of Opening No. 537, in the Sewell "B" bed, at an elevation of 1920' B., except that the thickness is reported only half as great.

Coal Opening—No. 539 on Map II.

On the east hillside of Big Branch of Indian Creek, 1 mile south-east of Opening No. 537 above; **Sewell "B" Coal**; elevation, 2020' B.

	Ft.	In.
Shale, gray, silicious.....	5	0
Coal , soft, columnar (slate floor).....	1	5

Coal Opening—No. 540 on Map II.

On west hillside of a north branch of Indian Creek, 2.3 miles north-west of common corner of Center, Barkers Ridge and Browns Creek Districts; **Sewell "B" Coal**; elevation, 2170' B.

	Ft.	In.
Sandstone, massive, Guyandot	15	0
Concealed and shale.....	10	0

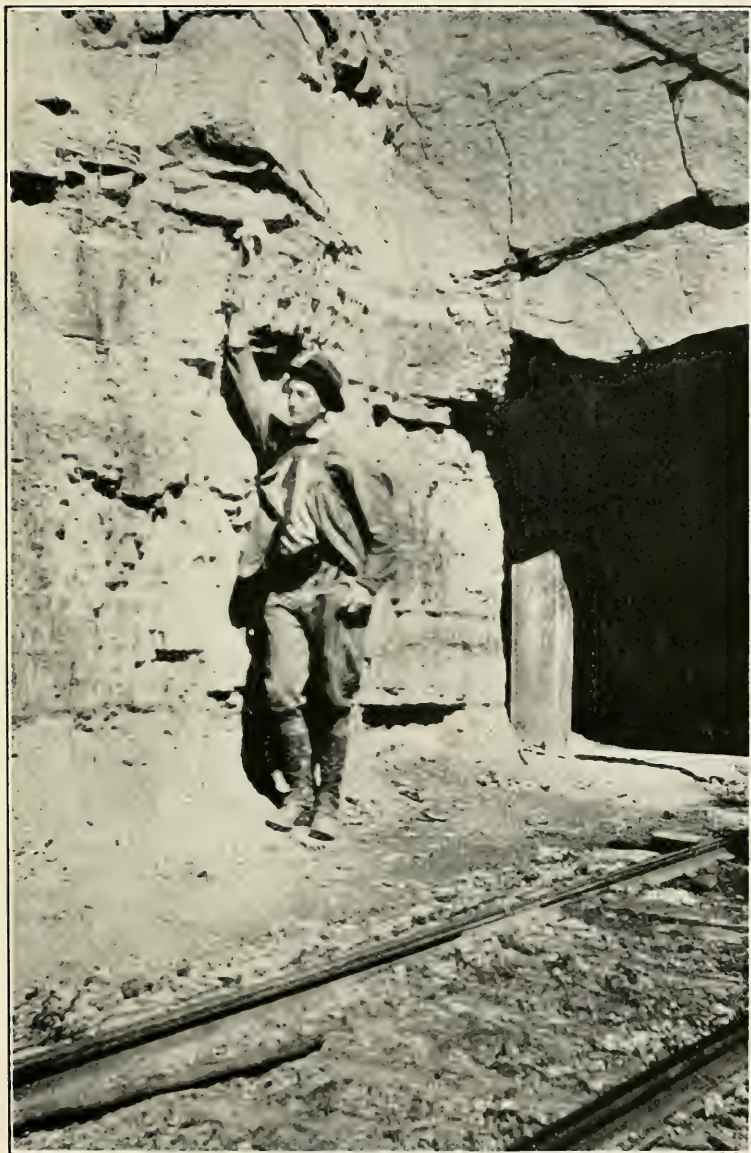


PLATE XXIV—Showing Eagle ("Middle War Eagle") Coal at Mine
No. 10 on Map II, 1.5 miles east of Panther,
McDowell County.

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			Ft.	In.
Coal, soft, columnar.....	2'	2 "		
Shale, dark gray.....	0	1		
Coal, soft, columnar.....	0	3½		
Shale, dark.....	0	5		
Coal, soft, columnar.....	1	5		
Shale	0	1½		
Coal, soft, columnar.....	0	3		
Shale, gray.....	0	2		
Coal, soft, columnar (shale floor).....	0	5	5	4

Coal Opening—No. 541 on Map II.

On head of the middle fork of Jenny Branch of Little Whiteoak Creek; Sewell "B" Coal; elevation, 2180' B.

			Ft.	In.
Sandstone, Guyandot, visible.....			5	0
Coal, soft, columnar.....	0'	6"		
Shale, gray.....	0	2		
Coal, soft, columnar.....	1	11		
Fire clay shale.....	0	10		
Coal, soft, columnar.....	1	6		
Fire clay shale.....	0	1		
Coal, soft, columnar.....	0	3		
Shale, gray.....	0	3		
Coal, columnar (fire clay shale floor).....	0	5	5	11

The following digging was examined by the writer:

Coal Opening—No. 541A on Map II.

Just west of road, on head of Little Whiteoak Creek, 1.4 miles southeast of mouth of Jenny Branch; Sewell "B" Coal; elevation, 2260' B.

			Ft.	In.
Sandstone and slate.....				
Coal, soft.....	0'	5"		
Slate, dark, 0" to.....	0	1		
Coal, soft.....	2	4		
Coal, concealed by water, re- ported (slate floor).....	0	11	3	9

Barkers Ridge District, Wyoming County.

In Barkers Ridge District, the Sewell "B" Coal has been opened at country banks quite extensively by natives for local domestic fuel. Here, the five following diggings were examined by Gawthrop:

Coal Opening—No. 542 on Map II.

On head of Copperhead Branch of Pinnacle, 1.9 miles southwest of Elmore; Sewell "B" Coal; elevation, 2255' B.

		Ft.	In.
Sandstone, coarse and soft, Guyandot , visible....		10	0
Coal, soft, columnar.....	2' 5"		
Slate, coaly.....	0 1		
Coal, medium soft, columnar..	0 8	3	2
Shale and concealed.....		100	0
Sewell Coal horizon.....			

About 200 feet northeast of the above opening, Gawthrop reports the overlying Guyandot Sandstone, 60 feet in thickness at an outcrop exposure.

Coal Opening—No. 543 on Map II.

On extreme head of Hickory Branch of Spider Creek, 2.2 miles northwest of Bud; Sewell "B" Coal; elevation, 2245' B.

		Ft.	In.
Sandstone, massive, soft, gray, Guyandot , visible..		5	0
Coal, columnar.....	0' 9"		
Shale, gray.....	0 5		
Coal, columnar.....	0 5		
Bone and slate.....	0 6		
Coal, visible.....	0 5	2	6
Coal, thickness concealed.....			

Coal Opening—No. 544 on Map II.

Just east of road fork, 1.1 miles southwest of Bud and 1.2 miles southeast of Opening No. 543 above; Sewell "B" Coal; elevation, 2275' B.

		Ft.	In.
Concealed and sandstone.....			
Coal, Sewell "B", concealed, opening closed, reported		5	0
Concealed		100	0
Coal, Sewell, soft.....		3	11

Alex. Lane Coal Opening—No. 545 on Map II.

On west of road, 1.8 miles southwest of Bud and 0.8 mile east of mouth of Hickory Branch of Spider; Sewell "B" Coal; elevation, 2280' B.

		Ft.	In.
Sandstone, massive, gray, coarse, Guyandot , visible		15	0
Coal, soft, columnar.....	0' 11"		
Slate	0 1		
Coal, soft, columnar.....	2 0		
Coal, concealed by water, reported	2 0	5	0
Sewell "B".....			

	Ft.	In.
Shale and concealed.....	75	0
Sandstone, massive, gray, Lower Guyandot	15	0
Coal, soft, columnar, Sewell ("Davy") at Opening		
No. 32 on Map II (shale floor).....	3	10

The interval between the two beds above was determined with hand-level by Gawthrop. The two following diggings were examined by the writer:

Coal Opening—No. 588 on Map II.

On south slope of Spider Ridge, 1.2 miles southwest of Opening No. 32, and $4\frac{1}{4}$ miles westward from Herndon; **Sewell "B" Coal**; elevation, 2260' B.

		Ft.	In.
Coal, soft, columnar	3' 4½"		
Shale, dark gray	1 1		
Coal, medium soft, columnar, (shale floor).....	1 3½	5	9

Coal Opening—No. 546 on Map II.

On the head of Laurel Branch of Pinnacle Creek, 2.1 miles southwest of the mouth of Spider Creek; **Sewell "B" Coal**; elevation, 2275' B.

	Ft.	In.
Sandstone, massive, visible, Guyandot	25	0
Coal, soft, columnar (shale and concealed floor)..<	2	4

Coal Opening—No. 547 on Map II.

On the head of Payne Branch of Whiteoak Branch, 0.1 mile northwest of the common corner of Center, Barkers Ridge and Browns Creek Districts; **Sewell "B" Coal**; elevation, 2315' B.

	Ft.	In.
Shale, sandy, visible.....	4	0
Coal, soft, 2' to	2' 2"	
Slate, gray, dark.....	0 1	
Coal, soft	0 3	
Slate, soft, gray, 8" to.....	0 10	
Coal, slaty	0 1	
Coal, soft	1 11	
Coal, slaty (slate floor).....	0 4	5 8

Sandy River District, McDowell County.

In Sandy River District, the Sewell "B" Coal does not appear to attain minable dimensions, as partially evidenced by

the two following exposures, the first examined by the writer, and the latter by Gawthrop:

Coal Exposure—No. 548 on Map II.

On south bank, 0.3 mile up Groundhog Branch of Bradshaw Creek; Sewell "B" Coal; elevation, 1360' B.

		Ft.	In.
Sandstone, visible, Guyandot.....		5	0
Coal, soft, bright.....	0' 5"		
Slate, black, fossil plants.....	0 3		
Coal, soft.....	0 3	0	11
<hr/>			
Fire clay shale.....		3	0
Concealed to bed of Groundhog Branch.....		2	0

Coal Exposure—No. 549 on Map II.

On bank of Hite Fork of Bradshaw Creek, 0.45 mile northeast of mouth of Aldrich Fork; Sewell "B" Coal; elevation, 1440' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Coal, soft, columnar.....	0' 6"		
Shale, gray.....	0 2		
Coal, soft, columnar.....	0 5	1	1
<hr/>			
Shale to bed of Hite Fork.....		8	0

In the northeast portion of Sandy River District, along the N. & W. Railway grade, the Sewell "B" Coal is only 11 inches thick at an exposure between Dry Branch and Wilmore, as exhibited in the Wilmore Section, pages 175-6.

Browns Creek District, McDowell County

In Browns Creek District, the approximate minable area of the Sewell "B" Coal, as outlined on Figure 5, is confined to several scattered patches near the ridge summits in the eastern half. At **Coal Prospect No. 550 on Map II** in the Sewell "B," on the south hillside of Spice Creek, 1 mile southeast of the mouth of Spice Laurel Branch, according to Gawthrop, this coal is reported 3½ feet thick, without partings, at an elevation of 1629' L., 100 feet in elevation above the Sewell ("Davy") Coal at the No. 2 mine of the Davy-Pocahontas Coal Co.—Mine No. 48 on Map II.

Big Creek District, McDowell County.

In Big Creek District, the Sewell "B" Coal is confined to several scattered patches, mostly in the northwest half. In this region its thickness and bed-structure are exhibited in the Coalwood—1.4 Miles Northeast and Dry Fork Station Sections, published in Chapter IV, pages 108-110 and 110-111, respectively.

Coal Exposure No. 551 on Map II, on the head of Mudlick Branch of Little Slate Creek, 0.8 mile northeast of Peapatch P. O., at an elevation of 1960' B., appears to be in the Sewell "B" seam. Here, Gawthrop reports 24 inches of soft columnar coal.

Quantity of Sewell "B" Coal Available.

Based on the foregoing evidence and a determination of its minable area by Gawthrop from that outlined on Figure 5 by interpolation between the Iaeger and Sewell beds, the following estimate is made for the amount of Sewell "B" Coal:

Probable Amount of Sewell "B" Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Slab Fork.....	2	1.0	640	55,756,800	2,230,272
Center.....	2	6.0	3,840	334,540,800	13,381,632
Barkers Ridge...	2.5	3.0	1,920	209,088,000	8,363,520
Totals.....		10.0	6,400	599,385,600	23,975,424
McDowell:					
Browns Creek...	2	10.0	6,400	557,568,000	22,302,720
Big Creek.....	2	30.0	19,200	1,672,704,000	66,908,160
Adkin.....	2	2.5	1,600	139,392,000	5,575,680
North Fork.....	2	0.5	320	27,878,400	1,115,136
Totals.....		43.0	27,520	2,397,542,400	95,901,696
Totals for Both Counties.		53.0	33,920	2,996,928,000	119,877,120

THE SEWELL ("DAVY") COAL.

The Sewell ("Davy") Coal, described in Chapter VI, pages 197-8, is a very valuable deposit of fuel, ranking third only to the No. 3 Pocahontas and Beckley beds in order of importance. Its approximate minable area is outlined on Figure 23, as also its western boundary line, west of which it has apparently thinned below minable dimensions and regularity. Its outcrop is outlined in detail on Map II. It has been mined on a commercial scale in McDowell County, where it is known locally as the "Davy" bed, and yields a fuel with the highest average calorific value—over 15,500 B. T. U's. per pound of coal—yet reported in the United States. It has been opened at country banks and prospected by the large land holding companies in Wyoming County at many points, as also in McDowell. Its thickness and character at these diggings and likewise at the commercial mines will now be described by magisterial districts.

***Oceana, Clear Fork and Huff Creek Districts,
Wyoming County.***

In Oceana District, the approximate minable area of the Sewell Coal, as outlined on Figure 23, is confined to a narrow strip less than 2 miles in width along the extreme southeast border. No exposures were observed on it in this locality, since its horizon lies below drainage throughout the entire area of the District; hence, the only source of information as to its thickness is the log of Coal Test Boring No. 1 on Map II, published on page 269. The latter is the authority for the position of the west boundary line of the minable area of this bed as drawn on Figure 23. From the results found in western McDowell, it is problematical whether other test borings west of this line in Oceana District will extend the minable area much farther in the same direction.

In Clear Fork and Huff Creek Districts, the same remarks apply as to the thickness of the Sewell Coal as given for Oceana District, except that not a single test boring has been sunk to this bed.

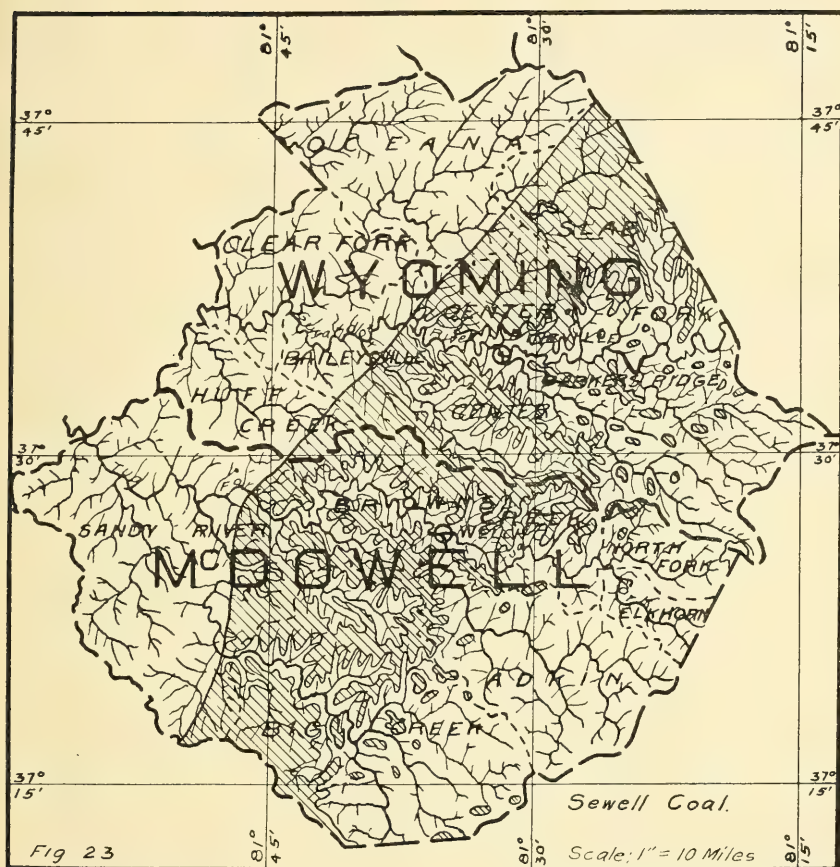


Figure 23.—Showing Approximate Minal Area of the Sewell ("Davy") Coal (See Explanations in Author's Preface).

Slab Fork District, Wyoming County.

In Slab Fork District, the Sewell Coal rises above drainage, and has been opened at country banks for local domestic fuel. Its thickness in Coal Test Borings Nos. 2-14 inclusive on Map II may be observed at a glance in the table of well records for Wyoming County, page 268.

A sample for analysis was collected from the core of the Sewell bed in Coal Test Boring No. 5 on Map II, 3.1 miles

northeast of McGraw, the composition of which is reported by E. M. Merrill as follows:

	Per cent.
Moisture	0.44
Volatle Matter.....	18.98
Fixed Carbon.....	77.29
Ash	3.29
Total.....	100.00
Sulphur	0.52

In the northwestern edge, where it first rises above the bed of Laurel Fork, the two following openings were examined by Gawthrop:

Coal Opening—No. 29 on Map II.

On north bank of Laurel Fork, 1.7 miles southwest of McGraw, 0.3 mile east of mouth of Laurel Branch; **Sewell Coal**; elevation, 1575' B.

		Ft.	In.
Sandstone, visible, Lower Guyandot		10	0
Shale, gray, silicious.....		3	0
Coal , soft, columnar.....	1' 3"		
Bone, 2" to.....	0 0		
Coal , medium soft.....	1 0		
Coal , soft, columnar.....	1 1	3	4
Shale and concealed.....		3	0
Sandstone, shaly, Welch , to bed of Laurel Fork...		7	0

Gawthrop collected a sample for analysis from the entire bed-section, the composition of which is given under **No. 29** in the table of coal analyses at the end of this Chapter. The results reveal a high grade fuel, similar in character to the same bed at its type locality in Fayette County.

Coal Opening—No. 552 on Map II.

On south bank of Laurel Fork, 1.5 miles southwest of McGraw, 0.5 mile east of Opening No. 29, last described; **Sewell Coal**; elevation, 1640' B.

		Ft.	In.
Sandstone, massive, Lower Guyandot , visible.....		10	0
Coal , soft.....	1' 5"		
Coal , bony, 0" to.....	0 2		
Coal , medium soft.....	1 0		
Coal , soft.....	1 3	3	10
Shale and concealed to bed of Laurel Fork.....		10	0

Six to seven miles southeastward in the same District, the following opening was examined by Gawthrop:

Coal Opening—No. 553 on Map II.

On head of a west branch of Still Run, 3.2 miles northwest of Mules; **Sewell Coal**; elevation, 2020' B.

	Ft.	In.
Shale, dark, slaty, visible.....	3	0
Coal, soft, columnar (shale floor).....	2	7

One-half mile northeastward, its thickness and stratigraphic position are exhibited in the Maben—2.1 Miles Southwest Section, in Chapter IV, pages 70-72.

Center District, Wyoming County.

In Center, the Sewell Coal lies above drainage over a large portion of the District, and for that reason it has been opened quite extensively at country banks by natives for local domestic fuel. Its thickness in Coal Test Borings Nos. 15-22 inclusive on Map II may be observed at a glance in the table of well records for Wyoming County, page 268. The seven following openings in the west portion of the District were examined by the writer:

Coal Opening—No. 30 on Map II.

On south hillside of Guyandot River, 1 mile due south of mouth of Skin Fork; **Sewell Coal**; elevation, 1385' B.

		Ft.	In.
Slate			
Coal, soft, columnar.....0'	8½"		
Coal, gray, medium soft.....0	1½		
Coal, soft, columnar, (sandy slate floor).....2	2	3	0

A sample for analysis was collected from the entire bed section, the composition of which is published under **No. 30** in the table of coal analyses at the end of this Chapter.

Coal Opening—No. 554 on Map II.

On east bank of Guyandot River, 0.4 mile northwest of mouth of Skin Fork; **Sewell Coal**; elevation, 1215' B.

	Ft.	In.
Sandstone, massive, visible, Lower Guyandot	4	0
Coal, soft, columnar.....	2	9
Sandstone, massive, Welch , and concealed to river	40	0

Coal Opening—No. 555 on Map II.

On south bank of Skin Fork, 0.1 mile southeast of Left Fork, 3.2 miles northwest of Pineville; **Sewell Coal**; elevation, 1415' B.

	Ft.	In.
Sandstone, massive, grayish white, Lower Guyandot	50	0
Shale, dark gray, sandy, plant fossils abundant..	12	0
Coal, bony.....0' 2"		
Slate, dark.....0 5		
Coal, bony.....0 4		
Coal, soft.....1 7		
Coal, bony.....0 2 Upper Bench 2' 8"		
Fire clay shale, sandy, dark gray.....2	0	
Sandstone, massive, hard, lenticular.....3	0	
Coal, soft.....3' 8"		
Fire clay, soft.....0 6		
Coal, concealed, reported.....1 0 Lower Bench 5 2 12 10		

In the above section, Moses Adams, a native, is authority for the thickness of the basal member of the lower bench, the usual thin—0 to 6 inches—parting separating the latter from the upper bench having developed locally to a thickness of 5 feet.

Coal Opening—No. 556 on Map II.

Edge of hill trail, $2\frac{1}{4}$ miles westward from Pineville, 0.7 mile southwest of Windom P. O.; **Sewell Coal**; elevation, 1540' B.

	Ft.	In.
Shale, dark gray, sandy, visible.....	1	6
Cannel slate, coaly.....0' 4"		
Coal, soft, columnar (slate floor)	3	4

Coal Opening—No. 31 on Map II.

On north bank, 0.5 mile up Gulf Branch of Rockcastle Creek, 1.9 miles northward from Pineville; **Sewell Coal**; elevation, 1660' B.

			Ft.	In.
1.	Sandstone, massive, Lower Guyandot			
2.	Coal , soft, bright.....	1' 0"		
3.	Slate, gray, with thin coal streaks	0 7		
4.	Coal , soft, bright (slate floor)	2 2	3	9

The writer collected a sample for analysis from Nos. 2 and 4 of the above section, the composition of which is published under **No. 31** in the table of coal analyses at the end of this Chapter.

The three following openings in the same District, on the waters of Rockcastle Creek, were examined by Gawthrop:

Coal Opening—No. 557 on Map II.

On east hillside of Rockcastle Creek, 0.4 mile south of Rockview, 2 miles north of Pineville; **Sewell Coal**; elevation, 1635' B.

	Ft.	In.
Shale, dark, silicious, with plant fossils, visible..	5	0
Shale, dark, with coal streaks.....	1	6
Coal , soft, columnar, bright (shale floor).....	1	11

Coal Opening—No. 558 on Map II.

On northwest bank of Rockcastle Creek, 0.3 mile northeast of Rockview; **Sewell Coal**; elevation, 1645' B.

		Ft.	In.
Sandstone, massive, visible, Lower Guyandot		6	0
Coal , soft, columnar.....	1' 3"		
Shale, dark with coal streaks..	4 5		
Coal , soft, columnar.....	1 0		
Coal , concealed, reported.....	0 6	7	2

Coal Opening—No. 559 on Map II.

On south bank of Rockcastle Creek, opposite mouth of Coon Branch, 3 miles northward from Pineville; **Sewell Coal**; elevation, 1660' B.

		Ft.	In.
Sandstone, massive, Lower Guyandot , visible....		10	0
Coal , soft.....	0' 10"		
Shale, dark, few small coal streaks	4 6		
Coal , soft, columnar (shale floor)	1 8	7	0

Southeastward on Bearhole Fork in the same District, Gawthrop examined the following digging:

Coal Opening—No. 560 on Map II.

On west bank of Bearhole Fork; 1 mile southwest of Newfound;
Sewell Coal; elevation, 1715' B.

			Ft.	In.
Sandstone, massive, Lower Guyandot			3	0
Coal , soft, with streaks of mother coal.....	0'	8"		
Coal , soft, columnar.....	1	9		
Coal , soft.....	0	10	3	3
<hr/>				
Shale and concealed.....			3	0
Sandstone, massive, Welch , to bed of Bearhole...			3	0

The following digging was examined by the writer:

Coal Opening—No. 561 on Map II.

On west branch of Sugar Run, 2.2 miles due east of Pineville;
Sewell Coal; elevation, 1700' B.

	Ft.	In.
Sandstone, Lower Guyandot , visible.....	4	0
Coal , soft.....	2	6
Coal , concealed by water.....		

Here, the thickness and stratigraphic position of the Sewell Coal are exhibited in the Pineville—Sugar Run Section, in Chapter IV, pages 74-6.

At **Coal Exposure No. 562 on Map II**, near the edge of Center District, in the hill road on the head of Little Whiteoak Creek, only 8 inches of the Sewell Coal is visible, as shown in the Little Whiteoak Creek Section, in Chapter IV, pages 77-9. The following opening was examined by Gawthrop:

Coal Opening—No. 563 on Map II.

In drain, 3.6 miles southeast of Pineville, 0.7 mile south of mouth of Belcher Branch; **Sewell Coal**; elevation, 1875' B.

	Ft.	In.
Sandstone, massive, gray, soft, Lower Guyandot , visible	3	0

		Ft.	In.
Coal, soft, columnar.....	1' 6"		
Slate, 0" to.....	0 0 $\frac{1}{4}$		
Coal, columnar.....	0 2		
Slate and shale.....	0 3		
Coal, medium soft, columnar..	0 6		
Coal, soft, columnar (slate floor)	1 5 $\frac{3}{4}$	3	11

The following opening was examined by the writer:

Coal Opening—No. 564 on Map II.

On southeast side of Baldwin Branch, 2.1 miles due south of Pineville; **Sewell Coal**; elevation, 1635' B.

		Ft.	In.
Slate, bluish gray, visible.....		5	0
Coal, soft.....	1' 0"		
Slate, black, fossil plants abundant.....	0 0		
Coal, soft, columnar (slate floor)	1 8	4	8

The six following openings, in the western edge of Center District, on the waters of Indian Creek, were examined by the writer:

Coal Opening—No. 565 on Map II.

Edge of road, south side of Wolfpen Branch, 1.8 miles northeast of Mulberry; **Sewell Coal**; elevation, 1575' B.

		Ft.	In.
Slate			
Coal, soft, 10" to.....	1' 1"		
Slate, black, plant fossils abundant.....	0 2		
Coal, soft, columnar (slate floor)	1 8	2	11

Coal Opening—No. 566 on Map II.

On head of Big Branch, 2 $\frac{3}{4}$ miles southwest of Pineville, 2 miles northeast of Mulberry; **Sewell Coal**; elevation, 1610' B.

		Ft.	In.
Shale, dark, sandy, visible.....		1	0
Coal, soft, columnar.....	2' 10"		
Shale, gray and hard.....	0 0 $\frac{3}{4}$		
Coal, soft (slate floor).....	0 3 $\frac{1}{4}$	3	2

Coal Opening—No. 567 on Map II.

On an east branch of Raccoon Branch, 0.5 mile due north of Mulberry; **Sewell Coal**; elevation, 1545' B.

		Ft.	In.
Shale, dark, visible, plant fossils abundant.....		7	0
Coal , bony.....	0' 2"		
Coal , soft, columnar.....	2 6		
Slate, gray.....	0 1		
Coal , harder (slate floor).....	2½	2	11½

Coal Opening—No. 568 on Map II.

On the northeast hillside of Indian Creek, 0.1 mile north of Mulberry; **Sewell Coal**; elevation, 1530' B.

	Ft.	In.
Shale, gray, sandy, visible.....	2	6
Coal , soft.....	2	6
Slate	2	0
Sandstone, flaggy, Welch	20	0

Coal Opening No. 569 on Map II.

On south hillside of Lick Branch, 0.5 mile southeast of Mulberry; **Sewell Coal**; elevation, 1495' B.

		Ft.	In.
Slate, gray.....			
Coal , soft, columnar.....	1' 2"		
Shale, gray.....	0 3		
Coal , slaty, hard.....	0 5		
Coal , soft, columnar (slate floor)	2 2	4	0

Coal Opening—No. 570 on Map II.

In run on west side of Turkeywallow Branch, 1¼ miles southwest of Mulberry; **Sewell Coal**; elevation, 1485' B.

		Ft.	In.
Shale, bluish gray, visible.....		20	0
Coal , soft.....	1' 3"		
Slate, black, 1" to.....	0 2		
Coal , soft, columnar (slate floor)	1 8	3	1

The five following openings in the southern edge of Center District, on the waters of Indian Creek, were examined by Gawthrop:

Coal Opening—No. 571 on Map II.

On south hillside, 0.6 mile up Nancy Fork, 2 miles southeast of Mulberry; **Sewell Coal**; elevation, 1535' B.

		Ft.	In.
Shale			
Coal	2' 0"		
Shale	0 4		
Coal	2 0	4	4
<hr/>			
Shale and concealed.....		10	0
Sandstone, massive, Welch , visible.....		5	0

The digging was closed, the foregoing section being furnished by J. L. Smith, a native.

Coal Opening—No. 572 on Map II.

On north hillside of Indian Creek, 1.9 miles southeast of Mulberry, 0.1 mile east of mouth of Bailey Branch; **Sewell Coal**; elevation, 1525' B.

		Ft.	In.
Shale, visible.....		5	0
Coal, soft, columnar.....	1' 10"		
Shale, dark.....	0 2½		
Coal, columnar.....	0 2		
Shale, dark, coal streaks.....	0 8		
Coal, columnar.....	0 5½		
Shale, gray.....	0 2		
Coal, soft, columnar.....	0 5	3	11

Coal Opening—No. 573 on Map II.

On north hillside of Indian Creek, 0.5 mile west of mouth of Hurricane Branch; **Sewell Coal**; elevation, 1680' B.

		Ft.	In.
Shale, visible.....		5	0
Coal, Sewell "A" , concealed, reported.....		1	0
Concealed and shale.....		15	0
Coal, visible.....	1' 6"		
Coal, concealed, reported 29"			
with shale parting.....	2 5	3	11
<hr/>			
Concealed		70	0
Sandstone, massive, forms cliffs with some concealed interval, Upper Raleigh		110	0

Coal Opening—No. 574 on Map II.

On east hillside of Hurricane Branch of Indian Creek, 1 mile northeast of Opening No. 573 above; **Sewell Coal**; elevation, 1745' B.

		Ft.	In.
Concealed			
Coal, soft, columnar.....	1' 2"		
Coal, harder.....	0 2		
Coal, soft, columnar....	0 6		
Shale, dark gray.....	0 2		
Coal	0 0¾		
Slate, dark, with coal streaks.	0 5		
Coal, medium soft (shale floor).	1 9¼	4	3

Coal Opening—No. 575 on Map II.

East edge of road, 3 miles southeast of Mulberry, 0.9 mile southwest of mouth of Hurricane Branch; **Sewell Coal**; elevation, 1695' B.

	Ft.	In.
Coal, clean, soft (shale top and bottom).....	3	6

Baileysville District, Wyoming County.

In Baileysville District, the Sewell Coal rises above drainage on the waters of Indian and Brier Creeks, where it has been opened at several country banks for local domestic fuel. It retains its normal development of Center and Slab Fork Districts. The following opening in this bed was examined by the writer:

Coal Opening—No. 576 on Map II.

On south bank, 0.4 mile up Shop Branch of Indian Creek, 0.4 mile northeast of Fanny; **Sewell Coal**; elevation, 1290' B.

		Ft.	In.
Shale, sandy and flaggy, visible.....		2	6
Coal, soft.....	2' 0"		
Coal, concealed by water to pavement	0 8	2	8

The following digging was examined by Gawthrop:

Coal Opening—No. 577 on Map II.

On point, 0.2 mile northeast of Fanny and 0.2 mile southwest of Opening No. 576; **Sewell Coal**; elevation, 1305' B.

	Ft.	In.
Shale, very silicious, visible.....	3	0
Coal, soft, columnar (shale floor and concealed)...	2	6

In the same region the following opening was examined by the writer:

Cole & Crane Prospect—No. 578 on Map II.

On northeast hillside of Indian Creek, 0.4 mile northwest of mouth of Mile Branch; **Sewell Coal**; elevation, 1360' B.

		Ft.	In.
Sandstone, Lower Guyandot			
Shale, sandy, dark in lower half, plant fossils rare	20	0	
Coal , soft, columnar.....	2' 0"		
Slate, dark gray.....	0 0¼		
Coal , soft (slate floor).....	0 5	2	5¼

The five following openings in the same District were examined by Gawthrop:

Coal Opening No. 28 on Map II.

On south hillside, 1 mile up Mile Branch of Indian Creek, 1.3 miles east of Fanny; **Sewell Coal**; elevation, 1500' B:

		Ft.	In.
Shale, dark gray, silicious, visible.....		3	0
Coal , soft, columnar.....	1' 11"		
Slate, 0" to.....	0 0½		
Coal , medium soft, columnar (slate floor).....	0 8½	2	8

A sample for analysis was collected from both benches at the above opening, the composition of which is published under **No. 28** in the table of coal analyses at the end of this Chapter. The results show a coal remarkably low in impurities—ash and sulphur.

Coal Opening—No. 579 on Map II.

On northeast hillside of Indian Creek, 0.7 mile northwest of mouth of Raccoon Branch; **Sewell Coal**; elevation, 1540' B.

		Ft.	In.
Coal , columnar.....	1' 10"		
Slate, 0" to.....	0 0½		
Coal , columnar.....	0 8½	2	7

Coal Opening—No. 580 on Map II.

On west bank of Brier Creek, just below Marsh Fork, 1 mile south-east of Brier; **Sewell Coal**; elevation, 1410' B.

	Ft.	In.
Shale, dark, silicious.....		
Coal , soft, columnar (shale floor and concealed)..	2	3

Coal Opening—No. 581 on Map II.

On east bank, 0.2 mile up Marsh Fork, 1.3 miles southeast of Brier; **Sewell Coal**; elevation, 1445' B.

	Ft.	In.
Shale, and sandstone, shaly, visible.....	5	0
Coal , soft, columnar.....	2	7
Shale and concealed.....	10	0
Sandstone, massive, Welch	5	0

David Short Coal Opening—No. 582 on Map II.

One mile up Marsh Fork of Brier Creek, 2.1 miles southwest of Mulberry; **Sewell Coal**; elevation, 1500' B.

	Ft.	In.
Shale, gray, silicious.....	15	0
Coal , soft, visible.....2' 6"		
Coal , concealed by water, re- ported .....1 0	3	6

Barkers Ridge District, Wyoming County.

In Barkers Ridge District, the Sewell Coal is confined to the ridge summits in the northwest half as shown on Figure 23. In this region it has been opened quite extensively by natives for local domestic fuel. The seven following openings were examined by Gawthrop:

Coal Opening—No. 583 on Map II.

On head of branch of Pinnacle Creek, 1 mile northeast of mouth of Little Whiteoak Creek; **Sewell Coal**; elevation, 1870' B.

	Ft.	In.
Sandstone, massive, gray and soft, Lower Guyan- dot	3	0
Shale, dark, flaggy.....	2	0
Coal , soft, columnar.....1' 6"		
Shale, dark.....0 0½		
Coal , medium soft, columnar..0 7½		
Coal , soft, columnar (shale floor) .....1 2	3	4

Coal Opening—No. 584 on Map II.

On point, south side of Guyandot River, 0.9 mile southwest of Elmore; **Sewell Coal**; elevation, 2185' B.

		Ft.	In.
Shale, gray, silicious, visible.....		10	0
Sandstone		2	0
Coal , soft.....	1' 4"		
Slate, black, hard.....	0 6		
Coal , harder.....	0 6		
Shale, soft.....	1 0		
Coal , medium soft.....	1 3		
Slate	0 4		
Coal (shale floor).....	0 8	5	7

The above opening was closed, the section being that furnished by Samuel Bell, a native.

Coal Opening—No. 585 on Map II.

On east side of ridge road, 2.2 miles northwest of Bud and 1.5 miles southwest of Elmore; **Sewell Coal**; elevation, 2160' B.

		Ft.	In.
Sandstone, massive, Lower Guyandot , visible....		10	0
Coal , soft, columnar.....	2' 10"		
Fire clay.....	0 1		
Coal , medium soft, columnar (shale floor).....	0 7	3	6

Coal Opening—No. 586 on Map II.

On south side road, $2\frac{1}{4}$ miles west of Bud and 0.6 mile south of Opening No. 585 above; **Sewell Coal**; elevation, 2150' B.

		Ft.	In.
Sandstone, gray, soft, Lower Guyandot , visible...		8	0
Coal , soft, columnar.....	2' 6"		
Fire clay shale.....	0 2		
Coal , columnar, visible (floor concealed)	0 7	3	3

Coal Opening—No. 587 on Map II.

On west side ridge road, 0.7 mile due east of Opening No. 586 above; **Sewell Coal**; elevation, 2150' B.

		Ft.	In.
Sandstone, massive, gray and soft, Lower Guyan- dot			
Coal , soft, columnar.....	3' 0"		
Slate, 0" to.....	0 $0\frac{1}{2}$		
Coal , visible (floor concealed by water).....	0 $5\frac{1}{2}$	3	6

Coal Opening—No. 32 on Map II.

On west side of road, $1\frac{3}{4}$ miles southwest of Bud and 3.7 miles northwest of Herndon; **Sewell Coal**; elevation, 2185' B.

	Ft.	In.
Coal, Sewell "B", at Opening No. 545 on Map II..	5	0
Shale and concealed.....	75	0
Sandstone, massive, gray, Lower Guyandot	15	0
Coal, soft, columnar, Sewell (shale floor).....	3	10

This measurement was determined with hand-level. A sample of Sewell Coal for analysis was collected at the above opening, the composition of which is published under No. 32 in the table of coal analyses at the end of this Chapter.

In the same District, the two following openings were examined by the writer:

Coal Opening—No. 589 on Map II.

On south branch of Barkers Creek, 0.8 mile southwest of Bud; **Sewell Coal**; elevation, 2190' B.

	Ft.	In.
Sandstone roof.....		
Coal, soft, columnar (slate floor).....	4	2

Coal Opening—No. 590 on Map II.

One mile southwest of Bud and $\frac{1}{4}$ mile southwest of Opening No. 589 above; **Sewell Coal**; elevation, 2190' B.

	Ft.	In.
Sandstone roof.....		
Coal, soft (floor concealed by water).....	4	0

The following opening was examined by Gawthrop:

Coal Opening—No. 591 on Map II.

On point of west side of George Branch, 0.9 mile southward from Bud; **Sewell Coal**; elevation, 2225' B.

	Ft.	In.
Sandstone, massive, gray and hard, Lower Guyandot , visible.....	10	0
Shale, gray, silicious.....	2	0
Coal, soft, columnar.....2' 6"		
Coal, medium soft.....0 5		
Shale, gray.....0 2		
Coal, medium soft, columnar (shale floor).....1 0	4	1

The five following openings in the same District were examined by the writer:

Coal Opening—No. 592 on Map II.

South edge of road, 0.2 mile southwest of road fork, 1.8 miles northwest of Herndon; **Sewell Coal**; elevation, 2415' B.

			Ft.	In.
Coal	2'	4"		
Slate	0	4		
Coal	0	4	3	0

The above opening was closed, the section being that given by Lon Steele, a native residing in the immediate vicinity.

Coal Opening—No. 593 on Map II.

On north side ridge road, 2.5 miles west of Herndon; **Sewell Coal**; elevation, 2415' B.

			Ft.	In.
1. Sandstone, massive, coarse, brown, Lower Guyandot , visible.....	3'	0"	10	0
2. Coal, soft, 30" to.....	3'	0"		
3. Slate, dark gray, 1½" to.....	0	2½		
4. Coal, soft (slate floor)....	0	4	3	6½

The variation in thickness of No. 2 of the above section is due to erosive action synchronous with the deposition of the Lower Guyandot Sandstone, while No. 4 appears to be the same bench that is generally present in the Davy, McDowell County, region, where it has practically the same dimensions, at about the same interval below the portion being mined.

Coal Opening—No. 594 on Map II.

On west side of road, 3.4 miles west of Herndon, 1 mile southwest of Opening No. 593 above; **Sewell Coal**; elevation, 2285' B.

			Ft.	In.
Sandstone, massive, coarse, brown, making cliff, Lower Guyandot			25	0
Slate, dark, 6" to.....			1	3
Coal, soft, columnar.....	2'	5"		
Slate, gray.....	0	1		
Coal, soft, columnar.....	0	5		
Slate, gray, soft.....	0	3		
Coal, soft, 10" to (slate floor).....	1	0	4	2

Coal Opening—No. 595 on Map II.

On east side ridge road, ¼ mile southward from Opening No. 594 above; **Sewell Coal**; elevation, 2300' B.

			Ft.	In.
Sandstone, massive, coarse, shaly at bottom, Lower Guyandot , visible.....			5	0

			Ft.	In.
Coal, soft.....	2'	11"		
Slate, coaly.....	0	2		
Coal, soft.....	0	4		
Slate, coaly.....	0	3		
Coal, soft (slate floor).....	1	9	5	5

Its stratigraphic position at the above opening is exhibited in the Whiteoak Branch Section, given in Chapter IV, pages 81-2.

At **Coal Exposure No. 596 on Map II**, 18 inches of the Sewell bed is visible in the ridge road on the Wyoming-McDowell County Line, 1.3 miles southeastward from the common corner of Barkers Ridge, Browns Creek and Center Districts, at an elevation of 2390' B.

Sandy River District, McDowell County.

In Sandy River District, the Sewell ("Davy") Coal is confined to a narrow strip along the eastern border as shown on Figure 23. West of this locality it appears to thin below minable dimensions and regularity, as revealed in boring records and crop exposures. In the east edge of the District, on Tug Fork, the following digging was examined by the writer:

Coal Opening—No. 597 on Map II.

On the east side of Snipe Branch, $\frac{1}{8}$ mile northeast of Wilmore; Sewell ("Davy") Coal; elevation, 1115' B.

			Ft.	In.
Slate, fossil plants.....				
Coal, bright, soft.....	0'	9"		
Slate, gray.....	0	0½		
Coal, soft (slate floor).....	1	0	1	9½

It is the Sewell Coal that is exposed in the N. & W. Railway cut, 0.4 mile northwest of Wilmore, 25 to 30 feet above track level, its thickness and stratigraphic position here being shown in the Wilmore Section, in Chapter VI, pages 175-6. Three-fourths mile northwest of Wilmore, it passes below the same railway grade, where it furnished fuel in operating machinery during the construction of this important transportation line. The latter point is apparently very close the western margin of its minable area.

Southwestward in Sandy River District, on the waters of Dry Fork, the two following exposures were examined by the writer, west of the minable area as outlined on Figure 23:

Coal Exposure—No. 597A on Map II.

On east hillside of Dry Fork, 1 mile northwest of Avondale (Ritter); **Sewell ("Davy") Coal**; elevation, 1025' B.

	Ft.	In.
Sandstone, massive, Guyandot , visible.....	25	0
Coal, Sewell "B"	0	10
Sandstone, Lower Guyandot	60	0
Coal, slaty, Sewell , at N. & W. Ry. grade.....	0	10

From the above exposure the measures were carried southeastward up Dry Fork and Crane Creek to the commercial mine—No. 53 on Map II—in the Welch Coal, and the Sewell-Welch interval determined to be approximately 70 feet.

Coal Exposure—No. 598 on Map II.

On west hillside of Bradshaw Creek, 0.3 mile southwest of mouth of Groundhog Branch; **Sewell ("Davy") Coal**; elevation, 1300' B.

	Ft.	In.
Sandstone, makes cliff, Lower Guyandot , visible..	20	0
Shale, sandy.....	10	0
Coal	0	11
Fire clay shale and sandy shale to road.....	15	0

The above exposure is only $\frac{3}{4}$ mile southwest of Coal Test Boring No. 40 on Map II, the log of which is published on page 295.

Browns Creek District, McDowell County.

In Browns Creek District, the Sewell ("Davy") Coal appears to be minable throughout the region of its occurrence, as shown on Figure 23 and Map II. Here, it has been opened quite extensively on a commercial scale, where it has long been known as the "Davy" bed, as described in Chapter VI, pages 197-8. In the table below is given a list of 12 commercial mines on the Sewell ("Davy") Coal in Browns Creek District that had been sampled previous to 1914 and their analyses and descriptions published in former Reports of the State Geological Survey. This table gives not only the page of the Report on which the description of the mine occurs, but also the

mine number on Map II; elevation above sea level, barometric or spirit level determinations being indicated by the letters "B" and "L", respectively; name of mine; and accurate location of the same. The composition of the coal is republished in the table of coal analyses at the end of this Chapter under the corresponding Mine Number on Map II.

Mine No. on Map II.	Elevation above Sea Level. Feet.	Name of Mine.	Location.	Other State Survey Report— Refer- ences to Descrip- tion.	
				Vol.	Page.
33	1310B	Belle Coal Co. (Cam- bridge)	Roderfield, 0.3 mi. N. E.....	II	666-7
34	1320B	Solvay Coll. Co. (Big Sandy)	Big Sandy.....	II	666-7
35	1267L	J. B. B. Coal Co. (No. 3).....	Hensley, 0.5 mi. N.	II(A)	250
36	1420B	Solvay Coll. Co. (Marytown)	Marytown	II	666-7
37	1382L	J. B. B. Coal Co. (No. 2)	Marytown, 0.5 mi. N. E.....	II(A)	249
38	1340L	J. B. B. Coal Co. (No. 5)	Marytown, 0.9 mi. N.	II(A)	249
39	1390L	J. B. B. Coal Co. (Ma- her No. 1).....	Twin Branch, 0.6 mi. N.....	II(A)	248-9
40	1411L	J. B. B. Coal Co. (Twin Branch)....	Twin Branch, 0.2 mi. N. E.....	II	666-7
41	1455	Superior-Poca. Coal Co. (No. 1).....	Davy, 0.1 mi. S..	II(A)	247-8
42	1455L	Superior-Poca. Coal Co. (No. 2½).....	Davy, 0.5 mi. N.E.	II(A)	248
45	1590B	Short Creek C. & C. Co. (Short Creek).	Pando, 0.3 mi. S.	II	666-7
46	1650B	Pando Coal Co.....	Deegans, 0.5 mi. S. W.....	II(A)	247

The six following mines on the Sewell ("Davy") Coal in Browns Creek District were visited and sampled for analysis by Gawthrop, the composition and fuel value of all but No. 43 on Map II being determined:

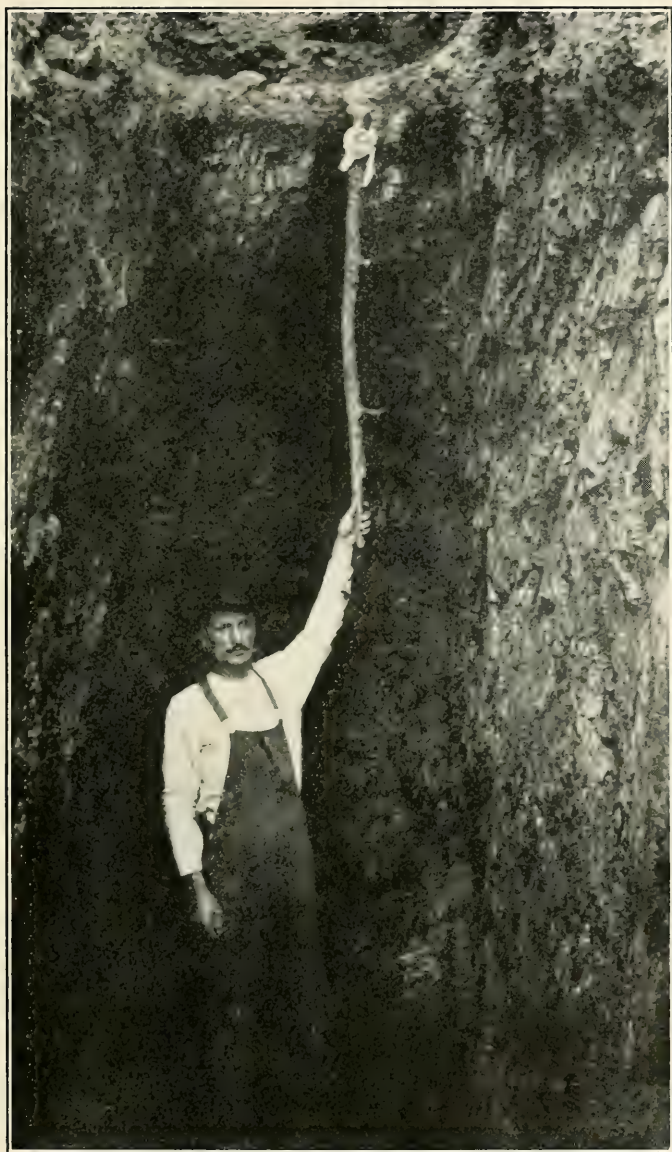


PLATE XXV—Showing Coal Prospect No. 743 on Map II
2.5 miles east of Pineville on the No. 9 Pocahontas bed.

**Superior-Pocahontas Coal Co. No. 3 (Helena)—
No. 43 on Map II.**

Browns Creek District, 0.7 mile northeast of Davy; **Sewell Coal.**

			Ft.	In.
1. Concealed				
2. Shale, bluish gray.....				
3. Coal, soft, columnar.....	1'	1½"		
4. Bone, 1" to.....	0	0½"		
5. Coal, medium hard, co- lumnar.....	0	6		
6. Coal, soft, columnar.....	1	3	2	11
7. Shale and concealed.....				

"Tidal elevation, 1450' L.; coal owned by Lasher Land Co.; principal office, Davy; daily capacity, 500 tons; daily output, 350 tons; 10 laborers and 65 miners employed; mule and electric haulage; used for steam; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, S. 45° E.; sample collected from Nos. 3, 5 and 6 of section in cross cut off Main Entry by R. M. Gawthrop; H. L. Hubbard, Foreman, authority for data."

The composition of the sample from the above mine was not determined owing to the failure of the Legislature to provide funds to continue the effective work of the Survey Laboratories.

J. B. B. Coal Co. No. 6—No. 44 on Map II.

			Ft.	In.
1. Concealed				
2. Shale, bluish gray.....			5	0
3. Shale, with coal streaks.....			0	6
4. Coal, soft, columnar.....	1'	1"		
5. Coal, gray.....	0	1		
6. Coal, medium hard.....	0	6		
7. Coal, soft, columnar.....	1	0	2	8
8. Slate and concealed.....				

"Tidal elevation, 1425' L.; coal owned by Lasher Land Co.; principal office, Boston, Mass.; daily capacity, 50 tons; daily output, 50 tons; 7 laborers and 19 miners employed; mule and electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 4, 5, 6 and 7 of section at face of Main Entry, 400 feet above 1st Right Heading, by R. M. Gawthrop; Richard Roberts, Foreman, authority for data."

NOTE—Mine has been in operation only a short time.

The composition of the sample from the above mine is published under **No. 44** in the table of coal analyses at the end of this Chapter.

Flanagan Coal Co. No. 2—No. 47 on Map II.

Browns Creek District, $\frac{1}{2}$ mile southeast of Erin; Sewell Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		6	0
3.	Coal, soft, columnar.....	0' 8"		
4.	Coal, soft, with sulphur streaks	0 5		
5.	Bone coal.....	0 1		
6.	Coal, soft, columnar.....	0 4		
7.	Slate, black, coaly, 0" to..	0 4		
8.	Coal, soft, columnar.....	1 2		
9.	Mother coal, 0" to.....	0 1		
10.	Coal, soft columnar.....	1 0	4	1
11.	Shale and concealed.....			

"Tidal elevation, 1525' B.; coal owned by Flanagan Coal Co.; principal office, Shenandoah, Pa.; daily capacity, 400 tons; daily output, 250 tons; 14 laborers and 25 miners employed; mule haulage; used for steam seaboard coal; shipped East; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 6, 8, 9 and 10 of section in Main Heading of West Side Mine by R. M. Gawthrop; J. F. Butler, Superintendent, authority for data."

The composition of the sample from the above mine is published under No. 47 in the table of coal analyses at the end of this Chapter.

Davy Pocahontas Coal Co. No. 2—No. 48 on Map II.

Browns Creek District, 0.7 mile southeast of Erin; Sewell Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		6	0
3.	Coal, soft, columnar.....	1' 2"		
4.	Bone coal.....	0 1		
5.	Coal, soft, columnar.....	1 6	2	9
6.	Shale and concealed.....			

"Tidal elevation, 1525' L.; coal owned by Davy Pocahontas Coal Co.; principal office, Baltimore, Md.; daily capacity, 500 tons; daily output, 200 tons; 8 laborers and 30 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; P. A. Grady, Superintendent, authority for data."

The composition of the sample from the above mine is published under No. 48 in the table of coal analyses at the end of this Chapter.

Premier Pocahontas Colliery Co. No. 2½—No. 49 on Map II.Browns Creek District, 0.3 mile southwest of Premier; **Sewell Coal.**

			Ft.	In.
1. Shale, bluish gray.....				
2. Slate, coaly.....			0	6
3. Coal, soft, columnar.....	1'	3½"		
4. Coal, hard, gray.....	0	1		
5. Coal, soft, columnar.....	1	8	3	0½
6. Shale, gray.....	0'	5"		
7. Coal	0	3		
8. Shale, slaty.....	0	11		
9. Coal, slaty.....	0	7	2	2
10. Slate and concealed.....				

"Tidal elevation, 1638' L.; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4 and 5 of section at face of Main South Heading by R. M. Gawthrop; H. N. Gonia, Foreman, authority for data." See Mine No. 2 for other data.

The composition and fuel value of the sample from the above mine is published under **No. 49** in the table of coal analyses at the end of this Chapter.

**Superior Pocahontas Coal Co. (Cletus No. 4)—
No. 148 on Map II.**

Browns Creek District, 1.1 miles southeast of Davy; **Sewell Coal.**

			Ft.	In.
1. Concealed				
2. Shale, gray, silicious.....			5	0
3. Coal, soft, columnar.....	0'	11"		
4. Bone	0	1½		
5. Coal, medium soft, columnar.....	0	9½		
6. Coal, soft, columnar.....	0	10	2	8
7. Slate and concealed.....				

"Tidal elevation, 1560' B.; coal owned by Bankers Pocahontas Coal Co.; principal office, Davy; daily capacity, 250 tons; daily output, 175 tons; 15 laborers and 42 miners employed; mule and electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; J. D. Swim, Foreman, authority for data."

The above mine was sampled by the U. S. Bureau of Mines, the composition and fuel value of which, as published from page 254 of Bulletin 22, U. S. Bureau of Mines, are given under **No. 148** in the last table of coal analyses at the end of this Chapter.

In addition to the foregoing commercial mines on the Sewell ("Davy") Coal in Browns Creek District, several prospects and country banks occur on it, the two following having been examined by the writer:

Coal Opening—No. 599 on Map II.

On east bank of Davy Branch, $2\frac{1}{4}$ miles northeast of Davy; Sewell ("Davy") Coal; elevation, 1455' B.

			Ft.	In.
Shale, dark, fossil plants abundant, visible.....			5	0
Coal, soft, columnar.....	1'	3½"		
Slate, black, fossil plants abundant	0	3½"		
Coal, soft, columnar.....	1	10	3	5
Slate to bed of Davy Branch.....			6	0

Coal Opening—No. 600 on Map II.

On west bank of Davy Branch; 1.7 miles northeast of Davy; Sewell ("Davy") Coal; elevation, 1455' B.

			Ft.	In.
Coal	6'	10"		
Shale, gray, 9' 0" to.....	10	0		
Coal (slate floor).....	1	6	12	4

The above opening had fallen shut in 1914, the section being that furnished by a native. This shows an unusual development of the shale parting in this region, a strictly local condition.

In the north central portion of Browns Creek District, Gawthrop examined the four following diggings:

Coal Opening—No. 601 on Map II.

On west hillside, 1 mile up Shannon Branch, 3 miles northwest of Welch; Sewell ("Davy") Coal; elevation, 1710' B.

			Ft.	In.
Sandstone, massive, gray, Lower Guyandot, visible			8	0
Coal, soft, columnar.....	1'	6½"		
Shale, gray.....	0	1½"		
Coal, medium soft, columnar..	0	3	1	11
Shale and concealed (by hand-level).....			63	5
Shale, bluish gray, silicious (by hand-level)....			5	0
Coal, soft.....	0'	4"		
Coal, gray and hard.....	0	5		
Coal, soft (slate floor).....	0	10	1	7

Coal Opening—No. 602 on Map II.

On waters of Upper Shannon Branch, $\frac{3}{4}$ mile northeast of mouth of Shannon Branch, 2 miles northwest of Welch; Sewell ("Davy") Coal; elevation, 1720' B.

		Ft.	In.
Sandstone, Lower Guyandot, visible.....		5	0
Coal, visible.....	1' 6"		
Coal, concealed, reported.....	1 0	2	6

Coal Opening—No. 603 on Map II.

On west hillside of Trail Fork of Browns Creek, 2.8 miles north of Olmsted; Sewell ("Davy") Coal; elevation, 1975' B.

		Ft.	In.
Coal	1' 6"		
Shale	0 10		
Coal	1 0	3	4

The above digging had fallen shut in 1914, the section being that furnished by a native.

Coal Opening—No. 604 on Map II.

On head of Trail Fork, 1 mile northeast of Opening No. 603 above; Sewell ("Davy") Coal; elevation, 2000' B.

		Ft.	In.
Shale, gray, silicious.....		10	0
Coal, medium soft, columnar.....	1' 8"		
Shale, $\frac{1}{2}$ " to.....	0 0		
Coal, soft, columnar (shale floor).....	0 4	2	0

In the southwest portion of Browns Creek District, on the waters of Spice Creek, the two following openings were examined by the writer:

Belle Coal Co. Opening—No. 606 on Map II.

On south bank of Shabbyroom Branch, 1 mile northeast of Erin, 1.5 miles east of Roderfield; Sewell ("Davy") Coal; elevation, 1480' B.

		Ft.	In.
Slate			
Coal, soft.....	1' 3"		
Coal, bony.....	0 9		
Slate, with coal streaks.....	0 10		
Coal, soft (slate floor).....	2 0	4	10

The above opening is merely a continuation of the commercial Mine 33 on Map II, the entrance to which is located 0.4 mile northeast of the railway station at Roderfield.

Flanagan Coal Co. Mine—No. 607 on Map II.

On north hillside of Spice Creek, $\frac{1}{2}$ mile southeast of mouth of Shabbyroom Branch; Sewell ("Davy") Coal; elevation, 1470' L.

		Ft.	In.
Slate, black, fossil plant stems abundant.....		15	0
Coal	0' 1½"		
Slate, black.....	0 6½"		
Coal, soft.....	1 0		
Slate, gray.....	0 1		
Coal, harder.....	0 9		
Bony slate and coal.....	0 10		
Coal, soft.....	0 11½"		
Slate, gray.....	0 1½"		
Coal, soft (slate floor).....	1 2	5	7

The above mine had been abandoned in 1914. Its interval above the base of the Beckley ("War Creek") bed at Mine No. 69 on Map II is 255 feet, as determined with hand-level by Gawthrop. The seam is too much split up with slate and shale to be profitably operated at this time.

Big Creek District, McDowell County.

In Big Creek District, the Sewell ("Davy") Coal is mined commercially at three different operations, and it has been opened at country banks and prospected by the large land holding companies quite extensively. As shown on Figure 23, it appears to be of minable dimensions and regularity throughout the region of its occurrence, the latter being definitely limited by the position of its outcrop as indicated on Map II. Its thickness in Coal Test Borings Nos. 44-64 inclusive on Map II, all within this District, may be observed at a glance in the table of borings for McDowell County, pages 290-93, as also in the detailed records published in this Report. The three following commercial mines in this bed in Browns Creek District were examined by Gawthrop:

Carter Coal Co. (Nora)—No. 50 on Map II.Big Creek District, 1.7 miles northeast of Coalwood; **Sewell Coal.**

			Ft.	In.
1. Concealed				
2. Shale, gray.....			5	0
3. Bone, 0" to.....	0'	4"		
4. Coal, soft, columnar.....	1	6		
5. Bone	0	1½		
6. Coal, soft, columnar.....	1	7½	3	7
7. Shale and concealed.....				

"Tidal elevation, 1742' L.; coal owned by Carter Coal Co.; principal office, John-
ston City, Tenn.; daily capacity, 600 tons; daily output, 500 tons; 40 laborers and 55
miners employed; electric haulage; used for steam; shipped East to Lamberts Point;
butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from
Nos. 4 and 6. of section at face of Main Entry of No. 3 Drift by R. M. Gawthrop;
R. M. Mann, Assistant Foreman, authority for data. Coal varies from 2' 10" to 3' 10".

The composition of the sample from the above mine is
published under **No. 50** in the table of coal analyses at the end
of this Chapter.

Carter Coal Co. No. 6—No. 51 on Map II.Big Creek District, 2.1 miles southeast of Coalwood; **Sewell Coal.**

			Ft.	In.
1. Concealed				
2. Shale, bluish gray.....			10	0
3. Coal, medium hard, colum- nar	1'	4"		
4. Coal, gray.....	0	1		
5. Coal, soft, columnar.....	0	6½		
6. Bone, 1½" to.....	0	0½		
7. Coal, soft, columnar.....	0	11		
8. Coal, bony.....	0	2		
9. Coal, soft, columnar.....	0	11	4	0
10. Shale and concealed.....				

"Tidal elevation. 1810' B.; coal owned by Carter Coal Co.; principal office, John-
ston City, Tenn.; daily capacity, 1500 tons; daily output, 1050 tons; 70 laborers and
125 miners employed; electric haulage; used for steam and domestic fuel; shipped
East and West, a large part to Lamberts Point; butts, N. 35° W.; faces, N. 55° E.;
greatest rise, southeast; sample 131G collected from Nos. 3, 4, 5, 7 and 9, of section
at face of 2nd Right Heading by R. M. Gawthrop; Scott Litton, Foreman, authority
for data." Note: Sample 131Ga collected from Nos. 3, 4 and 5; 131Gb from Nos.
7 and 9 of section.

Samples No. 131Ga and 131Gb from the foregoing mine
were not analyzed for reasons mentioned on a preceding page,
immediately after the description of Mine No. 43 on Map II.

The composition of sample No. 131G from the above mine is published under **No. 51** in the table of coal analyses at the end of this Chapter.

Henrietta Pocahontas Coal Co.—No. 52 on Map II.

Big Creek District, on north side of Dry Fork, at Bartley; **Sewell Coal.**

			Ft.	In.
1.	Concealed and gray shale.....			
2.	Bone, left up.....		0	4
3.	Coal, soft, columnar.....1'	0"		
4.	Coal, gray.....0	2		
5.	Coal, soft.....0	5		
6.	Coal, gray.....0	2		
7.	Coal, soft, columnar.....1	5	3	2
8.	Slate and concealed.....			

"Tidal elevation, 1385' E.; principal office, Bartley; daily capacity, 150 tons; daily output, 100 tons; 6 laborers and 20 miners employed; gasoline motor haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5, 6 and 7 of section in Room No. 5 off 4th Right Heading by R. M. Gawthrop; G. B. Hopkins, Foreman, authority for data."

The composition and fuel value of the sample from the above mine is published under **No. 52** in the table of coal analyses at the end of this Chapter.

On the waters of Clear Fork, in the northern edge of Big Creek District, the three following diggings were examined by Gawthrop:

Coal Opening—No. 608 on Map II.

On south side branch of Big Branch, 1.3 miles southwest of Coalwood; **Sewell ("Davy") Coal**; elevation, 1670' L.

			Ft.	In.
	Shale, bluish gray.....			
	Coal, medium soft, columnar..2'	1"		
	Bone (shale floor and concealed)	0 2	2	3

The above digging is 22 feet by hand-level above the mouth of Coal Test Boring No. 69 on Map II, the log of which, published on page 314, shows the interval from this bed to the Beckley ("War Creek") Coal to be 282 feet.

Coal Opening—No. 609 on Map II.

On east hillside, 1.3 miles up Snakeroot Branch of Clear Fork;
Sewell ("Davy") Coal; elevation, 1750' B.

		Ft.	In.
Shale, gray, silicious.....		10	0
Slate, coaly.....0'	3"		
Coal.....0	6½"		
Slate.....0	2½"		
Coal, soft, columnar.....1	3		
Shale.....0	2		
Coal, soft, columnar (shale floor).....1	5	3	10

Coal Opening—No. 610 on Map II.

On head of Clear Fork, 0.7 mile south of mouth of Perrycamp
 Branch, 2 miles southeast of Coalwood; **Sewell ("Davy") Coal**; eleva-
 tion, 1809' L.

		Ft.	In.
Shale, gray, silicious.....		10	0
Coal, soft, columnar.....0'	6½"		
Shale.....0	0½"		
Coal.....0	0½"		
Shale.....0	1		
Coal, soft, columnar.....1	3½"		
Slate, bony.....0	1		
Coal, medium soft, columnar (shale floor).....1	1	4	0

The five following openings were examined by Gawthrop:

Coal Opening—No. 611 on Map II.

On south side of road, head of Clear Fork of Barrenshe, 1.8 miles
 northeast of Caretta; **Sewell ("Davy") Coal**; elevation, 1785' B.

		Ft.	In.
Shale, dark, silicious, visible.....		15	0
Coal, columnar.....0'	6"		
Shale.....0	0½"		
Coal.....0	0½"		
Shale.....0	2		
Coal, visible.....0	6	1	3

Coal, concealed by water.....

Coal Opening—No. 612 on Map II.

On north hillside of Barrenshe, 0.5 mile east of Caretta; **Sewell Coal**; elevation, 1770' B.

		Ft.	In.
Shale, gray, sandy, visible.....		5	0
Coal, soft.....	1' 5"		
Slate, bony.....	0 4		
Coal, soft.....	0 7		
Shale, dark gray.....	0 5		
Coal, soft.....	0 10		
Slate, bony.....	0 1		
Coal, medium soft(shale floor)1	2	4	10

Coal Opening—No. 613 on Map II.

On a south branch of Dry Fork, 1.3 miles southwest of Yukon; **Sewell ("Davy") Coal**; elevation, 1520' B.

	Ft.	In.
Shale, gray, silicious, visible.....	5	0
Coal, soft, columnar.....	3	4
Sandstone, massive, Welch	20	0

One-half mile due northward, on the east hillside of Dry Fork, the writer observed 23 inches of Sewell Coal in a crop exposure at an elevation of 1520' B., 235 feet above the Beckley ("War Creek") bed at Mine No. 71 on Map II, on the opposite bank of Dry Fork.

Dry Fork Land Co. Prospect—No. 614 on Map II.

In drain, west side of Dry Fork, 1¼ miles due west of Yukon; **Sewell ("Davy") Coal**; elevation, 1475' B.

	Ft.	In.
Shale, bluish gray, visible.....	8	0
Coal, medium soft, columnar (shale floor and concealed)	2	2

Coal Opening—No. 615 on Map II.

On east bank of Threefork Branch, 0.8 mile northeast of English; **Sewell ("Davy") Coal**; elevation, 1505' B.

	Ft.	In.
Shale, gray, silicious, visible.....	5	0
Coal, medium soft.....	1	6
Shale to bed of Branch.....	2	0

The following interesting section was measured by the writer down the north hillside of Dry Fork, 0.7 mile northwest

of English, at **Coal Exposure No. 616 on Map II** in the Sewell ("Davy") bed:

	Thickness. Feet.	Total. Feet.
Sandstone, capping knob, making cliff, Middle laeger	30	30
Shale, buff, and concealed, mostly shale.....	45	75
Sandstone, Harvey , platy, making great vertical cliff.....	115	190
Concealed, mostly dark sandy shale, Sandy Huff	85	275
Sandstone, Guyandot	15	290
Concealed with dark shale, sandy near base...	75	365
Sandstone, Lower Guyandot , platy, making cliff	58	423
Coal , soft, 2" to.....0' 2½"	2	425
Slate, black, coal streaks...0 1½		
Coal , soft.....0 11		
Coal , bony.....0 2		
Coal , soft.....0 10	} ("Davy") Sewell.... (2' 3") (1435' B.)	
Sandstone, Welch , making cliff.....	20	445
Concealed	65	510
Sandstone, shaly, dark, laminated.....	23	533
Coal , soft, Little Raleigh (23").....	2	535
Sandstone, shaly, dark, laminated.....	30	565
Concealed to bed of Dry Fork.....	40	605

The stratigraphic succession in the above section is further corroborated by the log of Coal Test Boring No. 93 on Map II, located on Little Slate Creek, 2.2 miles southwestward, the details of which are published on page 341.

The following opening was examined by Gawthrop:

Coal Opening—No. 617 on Map II.

In bed of Bartlett Creek, 0.8 mile due north of English; Sewell ("Davy") Coal; elevation, 1515' B.

	Ft.	In.
Shale, gray, visible.....	2	0
Coal , soft, columnar.....1' 2"		
Shale, with coal streaks.....1 6		
Coal , soft, columnar, visible....0 6	3	2
<hr/>		
Coal , concealed by water.....		

At **Coal Exposure No. 618 on Map II**, on the north hillside of Dry Fork, 0.7 mile west of Atwell, the thickness and stratigraphic position of the Sewell bed are exhibited in the Section ¾ mile West of Atwell, pages 178-9. The four following openings on Little Slate Creek were examined by Gawthrop

Coal Opening—No. 619 on Map II.

On east bank, 0.1 mile up Right Fork of Little Slate Creek; **Sewell ("Davy") Coal**; elevation, 1380' B.

		Ft.	In.
Shale, dark, flaggy, visible.....		5	0
Coal, medium soft, columnar...0'	8"		
Coal, gray, harder.....0	2		
Coal, medium soft, columnar...1	1	1	11
<hr/>			
Shale and concealed.....		2	0
Sandstone, Welch , to bed of Right Fork.....		5	0

Gawthrop was inclined to correlate this bed as also that at the three following openings with the **Welch seam** on account of similarity of section with that of the latter coal at Welch, but the writer is inclined to place it at the **Sewell "Davy"** horizon. This correlation is further strengthened by the log of Coal Test Boring No. 93 on Map II, 0.6 mile eastward, as also the section given above for Coal Exposure No. 616 on Map II, 0.7 mile northwest of English. This seam undoubtedly belongs 60 to 70 feet above that operated at the commercial Mines Nos. 53, 54, 55 and 56 on Map II, farther down the Dry Fork drainage, the latter having been correlated with the Welch, and it is the same as that worked at Mine No. 52 on Map II, on the north hillside of Dry Fork, just below the mouth of Bartlett Creek. Again, the Sewell bed carries a bony coal a few inches below the top in this region, as may be readily seen at the entrance to the latter mine. Also, the measures are easily traced between Avondale and English by the exposures along the N. & W. Railway on Dry Fork.

Ritter Lumber Co. Coal Opening—No. 620 on Map II.

On south bank of Little Slate Creek, 0.15 mile west of Opening No. 619 above; **Sewell ("Davy") Coal**; elevation, 1385' B.

		Ft.	In.
Shale, dark gray, silicious.....		5	0
Coal, medium soft, columnar...0'	8"		
Coal, gray, harder.....0	2		
Coal, medium soft, columnar...0	8		
Coal, medium soft, gray, columnar (shale floor).....0	7	2	1

Coal Opening—No. 621 on Map II.

On north bank of Little Slate Creek, 0.5 mile southeast of mouth of Straight Fork; Sewell ("Davy") Coal; elevation, 1635' B.

	Ft.	In.
Sandstone, visible.....	5	0
Shale	2	0
Coal, medium soft, columnar...0' 10"		
Coal, harder, gray.....0 2		
Coal, medium soft, columnar...1 1		
Coal, harder, gray.....1 0	3	1
Shale and concealed to bed of creek.....	5	0

Coal Opening—No. 622 on Map II.

On south bank of Little Slate Creek, 0.2 mile southeast of Opening No. 621 above; Sewell ("Davy") Coal; elevation, 1645' B.

	Ft.	In.
Shale, gray, flaggy.....		
Coal, medium soft, columnar...0' 9"		
Coal, gray, bony.....0 3		
Coal, medium soft, columnar...0 10		
Coal, gray, harder.....1 2	3	0
Shale and concealed to bed of creek.....	5	0

For remarks concerning the correlation of the coal at the two foregoing openings, see description accompanying Opening No. 619 above.

Quantity of Sewell ("Davy") Coal Available.

Based on the foregoing data and a planimetric determination by Gawthrop of the approximate minable area as outlined on Figure 23 from Map II, the following estimate is made for the amount of Sewell ("Davy") Coal available:

Probable Amount of Sewell Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet Of Coal.	Short Tons of Coal.
Wyoming:					
Huff Creek.....	2.5	8.00	5,120	557,568,000	22,302,720
Slab Fork.....	2.5	50.00	32,000	3,484,800,000	139,392,000
Center	2.5	55.00	35,200	3,833,280,000	153,331,200
Baileysville	2.5	15.00	9,600	1,045,440,000	41,817,600
Barkers Ridge...	3	6.00	3,840	501,811,200	20,072,448
Totals.....		134.00	85,760	9,422,899,200	376,915,968
McDowell:					
Sandy River.....	3	30.00	19,200	2,509,056,000	100,362,240
Browns Creek...	3	46.80	29,952	3,914,127,360	156,565,094
Big Creek.....	3	65.70	42,048	5,494,832,640	219,793,305
Adkin	3	3.70	2,368	309,450,240	12,378,009
North Fork.....	3	0.70	448	19,514,880	780,595
Totals.....		146.90	94,016	12,246,981,120	489,879,243
Totals for Both Counties...		280.90	179,776	21,669,880,320	866,795,111

THE WELCH COAL.

The Welch Coal, which has been described briefly in Chapter VI, pages 199-200, is a very valuable deposit of fuel, as a minable bed being confined to the southern portions of Center and Barkers Ridge Districts, Wyoming County, and the middle portion of McDowell, as shown more definitely on Figure 24. Since it belongs only 60 to 80 feet below the Sewell ("Davy") Coal, its outcrop may be readily determined in the region of its occurrence, as that for the latter seam is outlined on Map II. In Wyoming it has been opened or prospected at only a few points, but in McDowell County it has been mined quite extensively on a commercial scale and opened at several country banks for local domestic fuel. Here it enjoys a reputation almost equal in excellence to that of the bed last described. Its thickness and character at these mines and diggings will now be discussed by magisterial districts.

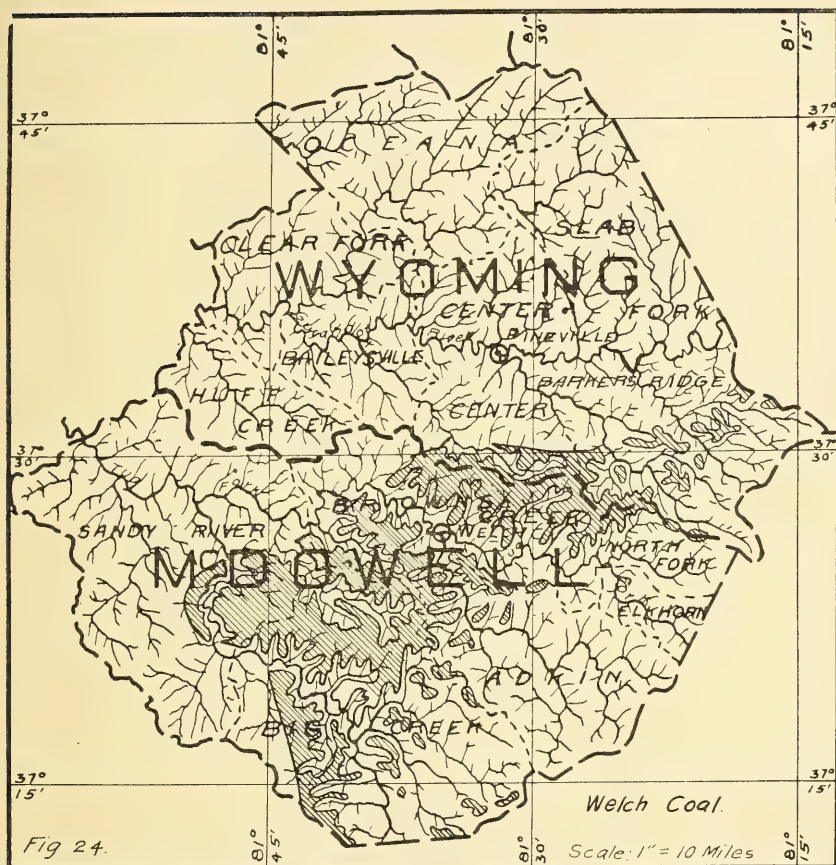


Figure 24.—Showing Approximate Minal Area of the Welch Coal
(See explanations in Author's Preface).

Center and Barkers Ridge Districts, Wyoming County.

The apparent minable area of the Welch Coal in Wyoming is confined to the southern borders of Center and Barkers Ridge Districts, as shown on Figure 24. In all that portion of the County lying to the northwest, it seems to have disappeared entirely or thinned below minable dimensions and purity. The logs of Coal Test Borings Nos. 5, 7, 8, 9 and 27, all of which are published on preceding pages of this Chapter, corroborate this conclusion, as also exposures of its horizon

where it crops above drainage. In the southern edge of Center District, very close the northwest margin of its minable area, the following opening was examined by Gawthrop:

Coal Opening—No. 623 on Map II.

On east hillside of a south branch of Indian Creek, 0.9 mile southeast of mouth of Nancy Fork; **Welch Coal**; elevation, 1535' B.

		Ft.	In.
Shale		1	0
Coal	0' 1"		
Shale, reported	2 5		
Coal, concealed, reported	1 6	4	0

In Barkers Ridge District, the five following openings were examined by Gawthrop:

Coal Opening—No. 624 on Map II.

On waters of Big Branch, east side of road, 2 miles southeast of Mullens; **Welch Coal**; elevation, 2195' B.

		Ft.	In.
Sandstone, massive, gray, Welch		15	0
Shale, sandy		2	0
Slate, coaly	0' 4"		
Coal, soft, columnar	1 4		
Coal, harder	0 6		
Slate, black	0 3		
Shale and coal	0 7	3	0

Coal Exposure—No. 625 on Map II.

In ridge road at school house, 2.7 miles southeast of Mullens; **Welch Coal**; elevation, 2255' B.

	Ft.	In.
Concealed		
Coal, visible	2	0
Sandstone and concealed		

Coal Opening—No. 626 on Map II.

In ridge road, 1.3 miles northeast of Herndon; **Welch Coal**; elevation, 2740' B.

	Ft.	In.
Concealed and sandstone		
Coal (shale floor)	1	6

Coal Prospect—No. 627 on Map II.

On head of Workman Branch, west hillside, 2 miles southwest of Elmore; **Welch Coal**; elevation, 2120' B.

	Ft.	In.
Concealed		
Coal, soft, columnar, visible, Sewell (2155' B.)...	1	0
Concealed	26	0
Sandstone, Welch , massive, gray.....	7	0
Coal, columnar, Welch (slate floor) and concealed)	2	0

Coal Opening—No. 628 on Map II.

On north hillside of Spider Creek, east side of hill road, 1 mile southeast of mouth of Hickory Branch; **Welch Coal**; elevation, 2175' B.

	Ft.	In.
Sandstone, massive, gray, soft, Lower Guyandot , visible.....	5	0
Coal, soft, columnar, Sewell ("Davy"), (2205' B.).	4	1
Concealed, with sandstone, Welch	30	0
Coal, concealed, but reported, Welch (floor concealed).....	1	8

In the same District, the three following openings were examined by the writer:

Coal Opening No. 629 on Map II, in the **Welch** bed, on the east side of the ridge road, 2.1 miles northwest of Herndon, at an elevation of 2315' B., 40 feet below the crop in the same road of the **Sewell** seam, was closed, and the thickness of the coal not ascertained.

Thos. W. Godfrey Coal Opening—No. 630 on Map II.

On west hillside of Sheridan Branch, east side of road, 3 miles southwest of Bud; **Welch Coal**; elevation, 2265' B.

	Ft.	In.
Coal, Sewell , at opening, including partings.....	5	0
Fire clay shale and concealed.....	28	0
Coal, Welch , opening closed, reported by Mr. Godfrey.....	2	0

At **Coal Exposure No. 631 on Map II**, in road, 0.4 mile southwest of Opening No. 630 above, the thickness and stratigraphic position of the **Welch** bed are published in the Mouth of Whiteoak Branch Section, pages 81-2. In the southwest edge of Barkers Ridge District, its thickness and stratigraphic position are shown in the Little Whiteoak Creek Section, pages 77-9.

Sandy River District, McDowell County.

In Sandy River, the approximate minable area of the Welch Coal appears to be confined to the east central border of the District, as shown on Figure 24. Westward from this locality, also northward and southward, it seems to have thinned below minable dimensions and regularity. In the region first mentioned, it is operated at 4 commercial mines—one on Crane Creek, and the other three along Dry Fork. The following commercial mine was examined and sampled for analysis by Gawthrop. It was also visited by the writer, who feels certain as to the correlation of the bed operated:

Colonial Pocahontas Coal Co. No. 2—No. 53 on Map II.

Sandy River District, 0.9 mile southeast of Ritter; **Welch Coal.**
Ft. In.

1. Concealed and shale.....					
2. Coal, medium soft, columnar.....	0'	11 "			
3. Coal, hard, gray.....	0	2½			
4. Coal, medium soft, columnar.....	2	0		3	1½
5. Slate and concealed.....					

"Tidal elevation, 1205' B.; principal office, Columbus, O.; daily capacity, 200 tons; daily output, 125 tons; 8 laborers and 35 miners employed; gasoline motor haulage inside and steam locomotive on outside; used for steam and domestic fuel; shipped West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 2, 3 and 4 of section at face of Main Entry by R. M. Gawthrop; D. B. Barricklow, Superintendent, authority for data."

The composition of the sample is given under **No. 53** in the table of coal analyses at the end of this Chapter.

The three following diggings along Dry Fork in the same District were examined by the writer:

Imperial Pocahontas Coal Co.—Mine No. 632 on Map II.

On west hillside of Dry Fork, 0.8 mile south of Avondale, opposite mouth of Ring Branch; **Welch Coal**; elevation, 1120' B.

	Ft.	In.
Sandstone, platy, Welch , visible.....	15	0
Shale, dark, silicious, flaggy, with fossil plants...	3	0
Coal, medium soft, columnar...1' 1"		
Coal, cannelly, harder, 1" to...0 3		
Coal, medium soft (shale floor).2 1	3	5

The above mine was once operated on a commercial scale, but owing to financial difficulties, augmented by the irregularities of the bed operated in this region, it has been abandoned in 1914. The section is typical of the Welch Coal in McDowell, and from this point it was carefully traced, as shown by the following openings and exposures, up Dry Fork to the mouth of Bartlett Creek, and its position established beyond question 60 to 80 feet below that correlated with the Sewell ("Davy") bed at Openings Nos. 52, 618, 619 and 620 on Map II, and described on preceding pages of this Chapter. The tracing of the Welch Coal along Dry Fork was greatly facilitated by the excessive development of the Welch Sandstone.

Coal Exposure—No. 633 on Map II.

At northeast portal of N. & W. Ry. tunnel, $1\frac{1}{4}$ miles southwest of Avondale (Ritter); **Welch Coal**; elevation, 1095' B.

	Ft.	In.
Sandstone, shaly, flaggy and platy, Welch	25	0
Shale, dark, sandy.....	3	0
Coal , medium soft.....0' 9"		
Curly cannel coal.....0 3		
Coal , medium soft.....1 7	2	7
<hr/>		
Sandstone, Upper Raleigh , to railroad grade.....	25	0

Coal Exposure—No. 634 on Map II.

At southwest portal of same railway tunnel, 0.1 mile southwest of Coal Exposure No. 633 above; **Welch Coal**; elevation, 1105' B.

	Ft.	In.
Sandstone, flaggy, Welch	45	0
Coal , soft.....0' 9"		
Coal , cannelly, slightly bony....0 4		
Coal , soft.....0 7	1	8
<hr/>		
Fire clay shale.....	0	8
Sandstone, Upper Raleigh , massive, bluish gray to buff, medium grained, micaceous, to railroad grade.....	30	0

The marked irregularity in the bed section of the Welch Coal in this region is exhibited in the two foregoing exposures, as also those below, the most of the changes in thickness apparently being confined to the bench below the usual cannelly bone.

At **Coal Exposure No. 635 on Map II**, in an N. & W. Ry cut at the southeast edge of Beartown, Gawthrop reports 16 inches of Welch Coal at an elevation of 1130' B., with cannelly bone near middle. The three following commercial mines, in the same region and District, were examined and sampled for analysis by Gawthrop:

Evans Pocahontas Coal Co.—No. 54 on Map II.

Sandy River District, on south side of Dry Fork, at Lex; Welch Coal.

		Ft.	In.
1.	Concealed		
2.	Shale, gray, silicious.....		
3.	Coal, 0" to	0	2
4.	Draw slate, 0" to.....	1	0
5.	Coal, soft, columnar.....1' 0"		
6.	Coal, gray, splinty.....0 8		
7.	Coal, medium soft, columnar.1 6	3	2
8.	Slate and concealed.....		

"Tidal elevation, 1160' B.; coal owned by Mrs. E. M. Evans; principal office, Lex; daily capacity, 75 tons; daily output, 50 tons; 4 laborers and 20 miners employed; mule haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 5, 6 and 7 of section at face of 1st Right Heading, by R. M. Gawthrop; H. N. Evans, General Manager, authority for data."

The composition of the sample collected from the above mine is published under **No. 54** in the table of coal analyses at the end of this Chapter.

Miller Coal Mining Co.—No. 55 on Map II.

Sandy River District, on north side of Dry Fork, at Lex; Welch Coal.

		Ft.	In.
1.	Concealed		
2.	Shale, gray, silicious.....	5	0
3.	Draw slate.....	0	6
4.	Coal, soft, columnar.....0' 10½"		
5.	Coal, hard, gray.....0 5		
6.	Coal, soft, columnar.....0 7½	1	11
7.	Slate and concealed.....		

"Tidal elevation, 1170' B.; coal owned by Mrs. E. M. Evans; principal office, Lex; daily capacity, 50 tons; daily output, 20 tons; 2 laborers and 8 miners employed; mule haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 4, 5 and 6 of section at face of Main Entry by R. M. Gawthrop; J. B. Miller, General Manager, authority for data."

The composition of the sample from the above mine is published under **No. 55** in the table of coal analyses at the end of this Chapter.

Cumberland Cannel Coal Co.—No. 56 on Map II.

Sandy River District, 0.5 mile southeast of Lex; **Welch Coal**.
Ft. In.

1. Concealed				
2. Shale, gray, silicious.....				
3. Coal, soft, columnar.....	1'	0"		
4. Coal, hard, gray.....	0	2		
5. Coal, gray, splinty.....	0	5		
6. Coal, medium soft, columnar.....	1	2	2	9
7. Shale and concealed.....				

"Tidal elevation, 1173' B.; coal owned by Mrs. E. M. Evans; principal office, Welch; daily capacity, 75 tons; daily output, 50 tons; 4 laborers and 14 miners employed; mule haulage; used for steam and domestic fuel; shipped West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5 and 6 of section in cross-cut between Main Heading and Air-Course, by R. M. Gawthrop; T. N. Daugherty, Foreman, authority for data."

The composition of the sample from the above mine is published under **No. 56** in the table of coal analyses at the end of this Chapter.

The two following diggings in the same District were examined by the writer:

Coal Opening—No. 636 on Map II.

On west bank, 0.1 mile up Oozley Branch, 0.4 mile northwest of Bradshaw; **Welch Coal**; elevation, 1205' B.

		Ft.	In.
Sandstone, massive, Welch , making great cliff, 75' to.....	100	0	
Shale, sandy.....	5	0	
Coal, soft.....	0'	9"	
Cannel bone.....	0	2	
Coal, soft (slate floor).....	1	6	2 5

Coal Exposure—No. 637 on Map II.

On west bank of Dry Fork, edge of road, $\frac{1}{4}$ mile southeast of Opening No. 636; **Welch Coal**; elevation, 1215' B.

		Ft.	In.
Sandstone, massive, making great cliff, Welch ...	70	0	
Coal, soft.....	0'	7½"	
Cannel bone.....	0	2	
Coal, soft.....	0	6½	1 4
Sandstone, Upper Raleigh , to road bed.....	5	0	

About 100 yards south of the above exposure, 10 to 15 feet of dark, laminated and pencil shale separate the Welch Sandstone from the Coal of the same name. The following exposure was examined by Gawthrop:

Coal Exposure—No. 638 on Map II.

On east bank of Dry Fork, in railroad cut, 500 feet below mouth of Bradshaw Creek; **Welch Coal**; elevation, 1200' B.

		Ft.	In.
Sandstone, massive, gray, Welch		60	0
Shale, sandy.....		20	0
Coal , medium soft, columnar...0'	8"		
Coal , hard, gray.....0	4		
Coal , medium soft.....0	5	1	5
<hr/>			
Fire clay shale.....		3	0
Sandstone, shaly, Upper Raleigh , to railroad grade		7	0

The stratigraphic position of the Welch Coal in this immediate region, as also in the northeast portion of Sandy River District, is exhibited in the Bradshaw, Harman Branch and Wilmore Sections, pages 96-9, 93 and 175-6, respectively.

Browns Creek District, McDowell County.

In Browns Creek District, the Welch Coal, as a minable seam, appears to be confined to that region lying southeast of a northeast-southwest line through Davy and Roderfield, as shown more definitely on Figure 24, where it has been operated quite extensively on a commercial scale, and also prospected and opened at country banks by natives for local domestic fuel. Its thickness and stratigraphic position are exhibited in the Marytown, Cub Branch-Pando, and Welch Sections, pages 177, 103-5, and 105-6 respectively. In the table below is given a list of 5 commercial mines on the Welch Coal in Browns Creek District that had been sampled previous to 1914, and their analyses and descriptions published in former Reports of the State Geological Survey. This table gives not only the page of the Report on which the description of the mine occurs, but also the mine number on Map II; elevation above sea level; and the name of the mine and its accurate location. The analysis of the coal is republished in the table

of coal analyses at the end of this Chapter under the corresponding Mine Number on Map II:

Mine No. on Map II.	Elevation Above Sea Level. Feet.	Name of Mine.	Location.	Other State Re- port page ref- erences to De- scription.
57	1575B	Pando Coal Co	Deegans, 0.5 mi. S. W.....	Vol. II(A), p. 243
59	1665B	Oregon Coal Co. (Ima)...	Hemphill, 0.5 mi. S. W.....	Vol. II(A), p. 243
60	1720B	Slick Rock Coal Co....	Hemphill, 0.7 mi. N. E.....	Vol. II(A), p. 242
61	1725B	Welch C&CCo (Hemphill)...	Hemphill, 0.6 mi. N. W.....	Vol. II(A), p. 242
66	1640B	Carter Coal Co	Coalwood, 0.8 mi. N. W.....	Vol. II(A), p. 244

The four following mines on the Welch Coal in Browns Creek District, except No. 151, which is in Big Creek District, were sampled and published by the U. S. Bureau of Mines. Their analyses are republished under their corresponding numbers on Map II in the U. S. G. Survey table of coal analyses at the end of this Chapter:

Mine No. on Map II.	Elevation Above Sea Level. Feet.	Name of Mine.	Location.	Other State Re- port page ref- erences to De- scription.
66	1640B	Carter Coal Co. No. 1...	Coalwood, 0.8 mile N. W.....	W.Va.Bull. No. 2, p. 237, No. 37.
149	1675B	Oregon Coal Co. No. 3...	Hemphill, 0.9 mile S. W.....	U. S. Bull. 85, p. 20.
151	1594L	Carter Coal Co. No. 2...	Coalwood, 0.5 mile W.....	W.Va.Bull. No. 2, p. 237, No. 31.
152	1620B	Carter Coal Co. No. 4...	Coalwood, 0.9 mile N. E.....	W.Va.Bull. No. 2, p. 237, No. 32.

At two of the foregoing mines, Gawthrop obtained the following data:

Oregon Coal Co. No. 3—No. 149 on Map II.

Browns Creek District, 0.9 mile southwest of Hemphill; **Welch Coal.**

Ft. In.

1. Concealed and shale, bluish gray.....
2. Coal, soft, columnar.....1' 0"
3. Coal, gray, hard.....0 3

			Ft.	In
4.	Coal, medium, hard, columnar.	1' 0"		
5.	Coal, soft, columnar.....	1 5	3	8
6.	Slate and concealed.....			

"Tidal elevation, 1675' B.; coal owned by Bankers Pocahontas Coal Co.; principal office, Hemphill; daily capacity, 1000 tons; daily output, 600 tons; 30 laborers and 80 miners employed; mule and electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; Robert Watson, Superintendent, authority for data." Data for Mines Nos. 2, 3 and 4.

The sample collected by Gawthrop at this mine was not analyzed, but the composition of the coal at this operation is published under **No. 149** in the U. S. G. Survey table of coal analyses at the end of this Chapter.

Carter Coal Co. No. 2—No. 151 on Map II.

Big Creek District, 0.5 mile west of Coalwood; **Welch Coal.**

			Ft.	In.
1.	Concealed and gray shale.....			
2.	Coal, soft, columnar.....	0' 11"		
3.	Coal, gray, bony.....	0 3		
4.	Coal, medium hard.....	2 2		
5.	Bone, 0" to.....	0 1		
6.	Coal, medium hard.....	1 5	4	10
7.	Shale and concealed.....			

"Tidal elevation, 1594' L.; coal owned by Carter Coal Co.; principal office, Johnston City, Tenn.; daily capacity, 200 tons; daily output, 125 tons; 17 laborers and 17 miners employed; electric haulage; used for steam; shipped East and West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; E. C. Hawks, Foreman, authority for data." Note: Coal lies in pockets; varies in working places from 3' 0" to 4' 10"; squeezes down to 0' 11" in one heading.

The sample collected at the above mine by Gawthrop was not analyzed, but the composition of the coal at this operation is published under **No. 151** in the U. S. G. Survey table of coal analyses at the end of this Chapter.

The five following commercial mines on the Welch Coal in Browns Creek District were visited and sampled by Gawthrop during 1914:

New Pocahontas Coal Co. No. 2—No. 58 on Map II.

Browns Creek District, 1.2 miles south of Antler; **Welch Coal.**

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray, with sandstone streaks...		5	0
3.	Coal, soft, columnar.....	1' 0½"		

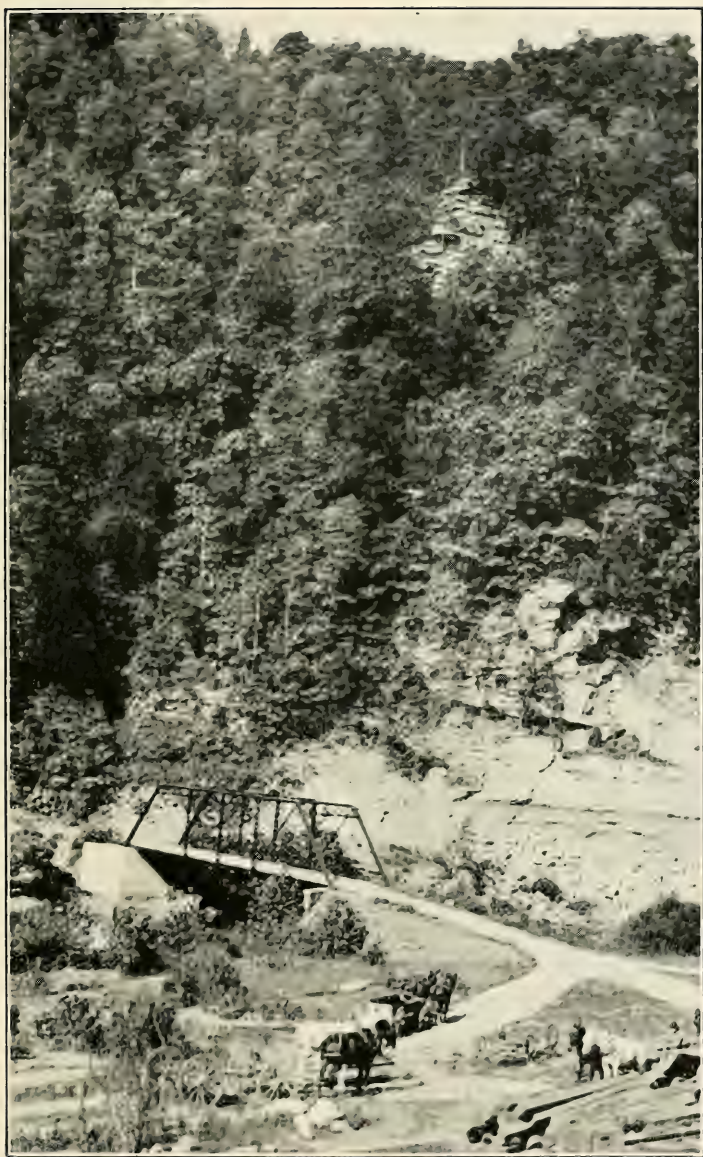


PLATE XXVI—Looking due west from Bradshaw railway station, showing the Welch Coal level with top of bridge, and the Welch and Guyandot? Sandstones, the latter being the upper cliff.

			Ft.	In.
4. Coal, gray, hard.....	0'	3½"		
5. Coal, hard, columnar.....	1	0		
6. Coal, soft, columnar.....	1	2	3	6
7. Shale and concealed.....				

"Tidal elevation, 1650' B.; coal owned by Bankers Pocahontas Coal Co.; principal office, Welch; daily capacity, 100 tons; daily output, 100 tons; 15 laborers and 26 miners employed; mule haulage inside, steam locomotive from mine to tippie; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5 and 6 of section at face of Main No. 2 Heading, 500 feet from drift mouth, by R. M. Gawthrop; J. W. Lester, Foreman, authority for data." Mine has been in operation about two months.

The composition of the sample from the above mine is published under **No. 58** in the table of coal analyses at the end of this Chapter.

Premier Pocahontas Colliery Co. No. 1—No. 62 on Map II.

Browns Creek District, 0.4 mile west of Premier; Welch Coal.		Ft.	In.
1. Concealed			
2. Shale, bluish gray.....		10	0
3. Coal, soft, columnar.....	0'	11	"
4. Coal, gray, bony.....	0	3½	
5. Coal, medium soft, columnar.....	0	6½	
6. Coal, harder, columnar.....	1	3	
7. Coal, soft, columnar.....	1	3	4 3
8. Shale and concealed.....			

"Tidal elevation, 1545' B.; coal owned by Premier Pocahontas Colliery Co., Walter Taylor and J. J. Sperry Heirs; principal office Lynchburg, Va.; daily capacity, 250 tons; daily output, 250 tons; 15 laborers and 45 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 3, 5, 6 and 7, of section, at face of No. 7 Left Heading off Main 1st Right Heading, by R. M. Gawthrop; J. D. Johnson, Foreman, authority for data." NOTE—No. 4 of section is thrown out at tippie.

The composition of the sample from the above mine is published under **No. 62** in the table of coal analyses at the end of this Chapter.

Premier Pocahontas Colliery Co. No. 2—No. 63 on Map II.

Browns Creek District, 0.3 mile southwest of Premier; Welch Coal.		Ft.	In.
1. Shale, bluish gray.....			
2. Coal, soft, columnar.....	1'	0	"
3. Coal, gray, bony.....	0	2½	
4. Coal, medium hard, columnar.....	0	10½	

			Ft.	In.
5.	Coal, harder, columnar...	1' 0"		
6.	Coal, soft, columnar.....	1 1	4	2
7.	Shale and concealed.....			

"Tidal elevation, 1554' L.; coal owned by Premier Pocahontas Colliery Co., Walter Taylor and J. J. Sperry Heirs; principal office, Lynchburg, Va.; daily capacity, 275 tons; daily output, 200 tons; 8 laborers and 36 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts and faces, irregular; greatest rise, southeast; sample collected from Nos. 2, 4, 5 and 6 of section at face of 1st Right Heading off No. 24 Main Heading by R. M. Gawthrop; H. W. Gonia, Foreman, authority for data." Note—Data for Mines Nos. 2 and 2½.

The composition of the sample collected from the foregoing mine is published under No. 63 in the W. Va. table of coal analyses at the end of this Chapter.

Premier Pocahontas Colliery Co. No. 3—No. 64 on Map II.

Browns Creek District, 0.3 mile northeast of Premier; Welch Coal.

			Ft.	In.
1.	Concealed and sandstone.....			
2.	Shale, bluish gray, silicious.....		3	0
3.	Coal, soft, columnar.....	1' 0"		
4.	Coal, hard, gray, splinty....	0 4		
5.	Coal, soft, columnar.....	1 0		
6.	Coal, harder, columnar....	1 4		
7.	Coal, soft, columnar.....	1 0	4	8
8.	Shale and concealed.....			

"Tidal elevation, 1610' B.; coal owned by Premier Pocahontas Colliery Co., Walter Taylor and J. J. Sperry Heirs; principal office, Lynchburg, Va.; daily capacity, 650 tons; daily output, 600 tons; 20 laborers and 75 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5, 6 and 7 of section, in Room No. 15 off 1st Right off No. 2 Straight Heading by R. M. Gawthrop; J. C. Saunders, Superintendent, authority for data." NOTE—Data given for Mines Nos. 3 and 3½; use same tippie. No. 4 of section is bony at places and is thrown out at tippie.

The composition of the sample from the above mine is published under No. 64 in the table of coal analyses at the end of this Chapter.

Premier Pocahontas Colliery Co. No. 4—No. 65 on Map II.

Browns Creek District, 0.7 mile southeast of Premier; Welch Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		5	0
3.	Coal, soft, columnar.....	0' 11½"		
4.	Coal, gray, hard, splinty..	0 3½		
5.	Coal, medium soft, columnar.....	0 6		

		Ft.	In.
6. Coal, harder, columnar.....	0' 11"		
7. Coal, soft, columnar.....	0 10	3	6
8. Shale and concealed.....			

"Tidal elevation, 1621' L.; coal owned by Premier Pocahontas Colliery Co., Walter Taylor and J. J. Sperry Heirs; principal office, Lynchburg, Va.; daily capacity, 1200 tons; daily output, 1000 tons; 15 laborers and 94 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5, 6 and 7 of section at face of 3rd Right Heading off Harman Entry by R. M. Gawthrop; C. P. Brewster, Assistant Foreman, authority for data." NOTE—Data given for Mines Nos. 4, 5 and 6. All use same tipple. Coal varies from 3' 3" to 4' 6".

The composition of the sample from the above mine is published under **No. 65** in the table of coal analyses at the end of this Chapter.

In addition to the foregoing commercial mines on the Welch Coal in Browns Creek District, this bed has been opened and prospected to a considerable extent by natives for local domestic fuel, where sections were obtained, as also at crop exposures. The following opening was examined by the writer:

Coal Opening—No. 639 on Map II.

On east bank, $\frac{3}{4}$ mile up Left Fork of Davy Branch, 1 mile north of Davy; **Welch Coal**; elevation, 1350' B.

	Ft.	In.
Shale, visible.....	5	0
Coal, soft, Sewell ("Davy"), (1425' B.).....	2	10
Concealed, mostly sandstone, by hand-level.....	77	0
Coal, soft.....	0' 8 "	
Coal, splinty, hard.....	0 2½	
Coal, soft (slate floor).....	1 3½ Welch	2 2

The three following openings in the same District were examined by Gawthrop:

Coal Opening—No. 640 on Map II.

On west hillside, 1.2 miles up Shannon Branch, 2¾ miles northwest of Welch; **Welch Coal**; elevation, 1640' B.

	Ft.	In.
Coal, Sewell ("Davy"), at Opening No. 601 on Map II.....	1	11
Shale and concealed (by hand-level).....	63	5
Shale, bluish gray.....	5	0
Coal, soft.....	0' 4"	
Coal, gray, hard.....	0 5	
Coal, soft, columnar (slate floor).....	0 10 Welch	1 7

Oregon Coal Co. Opening No. 4—No. 641 on Map II.

On head of Mod Branch, 1.4 miles southwest of Hemphill; **Welch Coal.**

		Ft.	In.
Shale, bluish gray.....			
Coal, columnar.....	1' 6"		
Coal, cannelly.....	0 4		
Coal, columnar (shale floor)....	2 1 (1670' B.)..	3	5

Coal Opening—No. 642 on Map II.

On east edge of hill road, 0.2 mile east of Indian Gap, 1.8 miles southwest of Welch; **Welch Coal**; elevation, 1725' B.

		Ft.	In.
Shale, gray, silicious, visible.....		6	0
Coal, soft, columnar.....	0' 11"		
Coal, hard, gray.....	0 5		
Coal, medium soft, columnar....	2 7	3	11
Shale and concealed.....		5	0
Sandstone, massive, Upper Raleigh		10	0

The following section was obtained by the writer at the original type opening in the Welch Coal of Campbell*:

J. H. Mitchell & Co. Coal Bank—No. 643 on Map II.

On southeast hillside of Elkhorn Creek, at Welch; **Welch Coal**; elevation, 1795' B.

		Ft.	In.
Shale, sandy and buff, visible.....		12	0
Coal, medium soft.....	0' 10"		
Cannelly bone.....	0 3		
Coal, soft (slate floor).....	1 9	2	10

The above is the same bank referred to by I. C. White on page 666 of Volume II of the State Geological Survey Reports, whereat the composition of the coal, as reported in the Folio last cited, is republished as follows:

*M. R. Campbell, Tazewell Folio No. 44, U. S. G. Survey, p. 5, col. 3; 1898.

	Per cent.
Moisture	0.21
Volatile Matter.....	19.32
Fixed Carbon.....	70.42
Ash	10.05
Total.....	100.00
Sulphur	0.73
Phosphorus	trace

The unusually high percentage of Ash is evidently due to the inclusion of the cannelly bone in the sample, a suggestion that is corroborated by the results published for this bed in both the tables of analyses at the end of this Chapter.

The four following exposures in the same District were examined by Gawthrop:

Coal Prospect—No. 644 on Map II.

On northwest hillside of Browns Creek, edge of hill road, 1.4 miles northwest of Welch; **Welch Coal**; elevation, 1830' B.

	Ft.	In.
Shale, visible.....	3	0
Coal, columnar.....0' 9"		
Bone	0	1
Coal, columnar (slate floor)....1 2	2	0

Coal Opening—No. 605 on Map II.

On waters of Browns Creek, 2.5 miles northeast of Olmsted, 2 miles northwest of Kimball; **Welch Coal**; elevation, 2060' B.

	Ft.	In.
Sandstone, massive, gray, Welch , visible.....	10	0
Coal, medium soft (shale floor).....	1	10

Coal Opening—No. 645 on Map II.

On west hillside, head of Bottom Creek, 3.3 miles northeast of Vivian, 3.6 miles northwest of North Fork; **Welch Coal**; elevation, 2190' B.

	Ft.	In.
Sandstone, gray, Welch , visible.....	3	0
Coal, medium soft, columnar (shale floor).....	2	2

Coal Prospect—No. 646 on Map II.

On south hillside of Spice Creek, 0.2 mile northwest of mouth of Cottontree Branch, 1 mile northwest of Premier; **Welch Coal**; elevation, 1530' B.

	Ft.	In.
Sandstone, visible, Welch	5	0
Coal , weathered (shale floor).....	2	9

The above prospect belongs 65 feet in elevation below another in the Sewell ("Davy") Coal.

Big Creek District, McDowell County.

In Big Creek District, the Welch Coal appears to attain minable dimensions and purity throughout the region of its occurrence, except along the southwest border, as more definitely shown on Figure 24. There are three commercial mines on this bed on the waters of Clear Fork, and it has also been opened and prospected at several points by natives for local domestic fuel. Its thickness and stratigraphic position are exhibited in the sections for Coalwood—1.4 Miles Northeast, Jacob Fork—1 Mile North, and Head of Vall Creek, in Chapter IV; and in the Atwell Section, Chapter VI, pages 108, 112, 117 and 179, respectively. Of the three commercial mines, **Nos. 66, 151 and 152 on Map II**, these have already been described or referenced on a preceding page under the discussion of the Welch Coal in Browns Creek District. Several sections will now be given that were obtained at crop exposures, country banks and other diggings.

The four following openings, on the waters of Clear Fork in Big Creek District, were examined by Gawthrop:

Coal Prospect—No. 647 on Map II.

On north bank of Big Branch of Clear Fork, 1.5 miles southwest of Coalwood; **Welch Coal**; elevation, 1585' B.

	Ft.	In.
Shale, gray.....		
Coal , soft.....	1	10
Shale and bone.....		

The above opening was closed in 1914, the section being that by R. C. Collins.

Coal Opening—No. 648 on Map II.

On east bank, 0.7 mile up Daycamp Branch of Clear Fork, $2\frac{1}{4}$ miles northwest of Coalwood; **Welch Coal**; elevation, 1540' B.

		Ft.	In.
Slate roof.....			
Coal, columnar.....	0' 10 "		
Slate	0 0 $\frac{1}{4}$		
Coal, columnar.....	0 3 $\frac{1}{4}$		
Bone	0 1 $\frac{1}{2}$		
Coal	0 3 $\frac{1}{2}$		
Slate, sandy.....	0 8 $\frac{1}{2}$		
Coal, columnar.....	0 10	3	1
Shale and concealed to run.....		5	0

Coal Prospect—No. 650 on Map II.

On head of Perrycamp Branch of Clear Fork, 2.6 miles southeast of mouth of Snakeroot Branch; **Welch Coal**; elevation, 1775' B.

		Ft.	In.
Sandstone, massive, Welch , visible.....		5	0
Draw slate.....		0	6
Coal, columnar.....	1' 0"		
Coal, gray, hard.....	0 2		
Coal, columnar.....	1 0		
Coal, gas, medium soft (shale floor).....	0 6	2	8

The following opening in the same District, on the waters of Big Creek, was examined by Gawthrop:

Coal Prospect—No. 651 on Map II.

On west hillside of a branch of Big Creek, 2.8 miles due east of Yukon; **Welch Coal**; elevation, 1905' B.

		Ft.	In.
Shale			
Coal, medium soft.....	1' 0"		
Coal, hard, bony, gray.....	0 4		
Coal, medium soft.....	0 8 Welch	2	0
Shale and concealed.....		88	0
Shale, bluish gray.....		5	0
Coal, soft, Little Raleigh (1810' B.).....		2	6
Shale			

In the western edge of Big Creek District, the following opening was examined by Gawthrop:

Coal Opening—No. 652 on Map II.

On west hillside, 0.1 mile up Atwell Branch of Dry Fork, immediately northwest of Atwell; **Welch Coal**; elevation, 1335' B.

		Ft.	In.
Shale			
Coal, medium soft, columnar...	0' 8"		
Coal, gray, harder.....	0 2		
Coal, bony.....	0 1		
Coal, gray.....	0 3		
Coal, medium soft, columnar...	1 4	2	6
<hr/>			
Shale and concealed to Coal Test Boring No. 92 on Map II.....		45	0

On the northwest hillside of Dry Fork, 0.3 mile southwestward, the following exposure was examined by the writer, the section being measured with hand-level:

Coal Exposure—No. 653 on Map II.

	Thickness.	Total.
	Feet.	Feet.
Sandstone, Lower Guyandot , makes cliff.....	50	50
Coal, Sewell ("Davy"), with 3" of cannelly bone 9" below top.....	2	52
Sandstone, Welch , massive, making great cliff, estimated.....	67	119
Shale, dark.....	6.5	125.5
Coal, soft.....0' 4" } Welch (1285' B.)..	1.2	126.7
Bone .....0 5 }		
Coal, soft.....0 4 }		
Sandstone, shaly, dark, laminated, Upper Ra- leigh	38.8	165.5
Coal, soft, Little Raleigh (shale floor).....	1.5	167

The Welch Coal, as represented here, may be directly traced northwestward down Dry Fork along the N. & W. Ry. grade to the commercial mines—Nos. 56, 55, 54 and 53, on Map II, described on preceding pages of this Chapter under the discussion of the Welch Coal in Sandy River District.

Quantity of Welch Coal Available.

Based on the foregoing evidence and a determination of the area by Gawthrop as outlined on Figure 24, the following estimate is made for the probable amount of Welch Coal:

Probable Amount of Welch Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Center	1.5	8.0	5,120	334,540,800	13,381,632
Barkers Ridge...	1.5	10.0	6,400	418,176,000	16,727,040
Totals.....	.....	18.0	11,520	752,716,800	30,108,672
McDowell:					
Sandy River.....	2.0	14.0	8,960	780,595,200	31,223,808
Browns Creek...	2.5	40.0	25,600	2,787,840,000	111,513,600
Big Creek.....	2.5	60.0	38,400	4,181,760,000	167,270,400
Adkin	2.5	6.0	3,840	418,176,000	16,727,040
North Fork.....	1.5	2.0	1,280	83,635,200	3,345,408
Totals.....	.....	122.0	78,080	8,252,006,400	330,080,256
Totals for Both Counties..		140.0	89,600	9,004,723,200	360,188,928

THE BECKLEY ("WAR CREEK") COAL.

The Beckley ("War Creek") Coal, described in Chapter VI, pages 205-6, is a valuable deposit of fuel, ranking second only to the No. 3 Pocahontas bed in economic importance in the territory of this Report. Its approximate minable area is outlined on Figure 25, as also its western boundary line, west of which it has thinned below minable dimensions and regularity. Its outcrop is outlined in detail on Map II. It is mined commercially in McDowell County, where it is known locally as the "War Creek" bed. It has been opened at country banks and prospected by the large land holding companies in Wyoming at many points, as also in the former County. Its thickness and character at these diggings and likewise at the commercial mines will now be described by magisterial districts.

*Oceana, Clear Fork, Huff Creek and Baileysville Districts,
Wyoming County.*

In these four Districts, the apparent minable area of the Beckley Coal catches only a few acres in the eastern points of Oceana and Baileysville, as shown on Figure 25. It lies en-

tirely below drainage, the only source of information as to its thickness and character being the log of Coal Test Boring No. 1 on Map II, page 270, which shows the coal much split up with shale, and hence of doubtful value. This record is the authority for the west boundary line of the minable area as drawn on Figure 25 in this portion of the County. Judging from the results found in western McDowell it is problematical whether other test borings west of this line in Wyoming will extend the minable area much farther in the same direction.

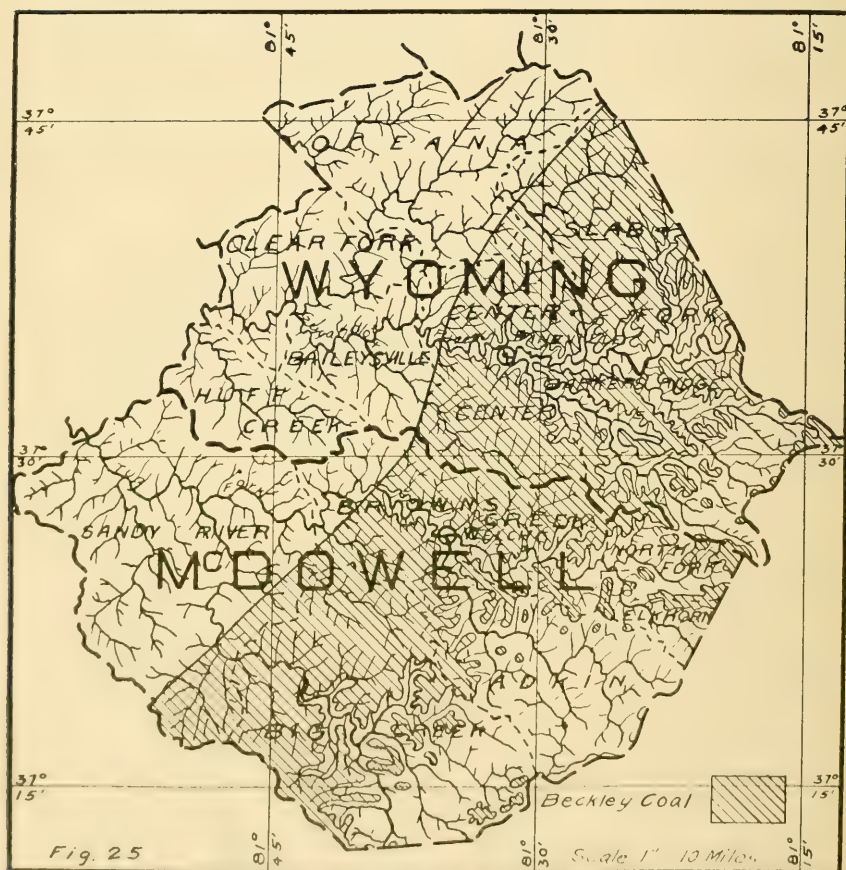


Figure 25.—Showing Approximate Minal Area of the Beckley ("War Creek") Coal (See explanations in Author's Preface).

Slab Fork District, Wyoming County.

In Slab Fork District, the Beckley Coal attains minable dimensions, although patchy and somewhat irregular in its occurrence. Its thickness may be observed at a glance in the table of summarized records for Wyoming County, page 268, in Nos. 3, 4, 5, 6, 7, 8, 9 and 10 on Map II, and also more in detail in the complete logs of these borings, published on the pages immediately following the table. A sample of the core from the Beckley Coal was collected at Boring No. 3 on Map II—on Laurel Branch, 2.4 miles northwest of Saulsville—the composition of which, as reported by Mr. E. M. Merrill, of Beckley, W. Va., is as follows:

	Per cent.
Moisture	0.46
Volatile Matter.....	21.36
Fixed Carbon.....	74.84
Ash	3.34
Total.....	100.00
Sulphur	0.68

In the same District, its thickness and stratigraphic position are exhibited in the Maben—2.1 Miles Southwest and Left Fork of Allen Creek Sections, in Chapter IV, pages 70-2 and 72-4, respectively. Along Slab Fork, between Hotchkiss and Mullens, the Fire Creek bed is often misnamed the Beckley Coal by prospectors. In this locality, it is more or less lenticular, the overlying Lower Raleigh Sandstone sometimes cutting it away entirely, a feature that may be observed at crop exposures along the Virginian Railway grade between Slab Fork Station in Raleigh County and Maben in Wyoming.

Center District, Wyoming County.

In Center District, the Beckley Coal has been opened quite extensively at country banks for domestic fuel. Its thickness and stratigraphic position are exhibited in the Pineville-Sugar Run and Pineville-Williamson Branch Sections, pages 74-6 and 174-5, respectively, the latter being measured at **Coal Opening No. 658 on Map II**; and in the log of Coal Test Boring No. 17A on Map II, page 283.

The two following openings and exposures were examined by the writer:

Coal Exposure—No. 657 on Map II.

On the south hillside of Guyandot River, 0.2 mile below the mouth of Big Branch; **Beckley Coal**; elevation, 1245' B.

			Ft.	In.
Shale, sandy and flaggy.....			35	0
Coal, with $\frac{1}{2}$ " slate near mid-				
dle	0'	5"		
Shale, and shaly sandstone...	10	0		
Coal, soft.....	0	5		
Slate, gray.....	0	0 $\frac{1}{4}$		
Coal, soft (to shale floor)....	1	2 $\frac{3}{4}$	12	1

Coal Opening—No. 659 on Map II.

On east hillside of Williamson Branch, 0.4 mile northwest of Pineville; **Beckley Coal**; elevation, 1455' B.

		Ft.	In.
Sandstone, massive, visible.....		3	0
Coal, soft, columnar, 30" to (gray slate floor)....		2	11

The following opening was examined by Gawthrop:

Coal Opening—No. 660 on Map II.

On west hillside of Rockcastle Creek, 0.5 mile north of Pineville; **Beckley Coal**; elevation, 1460' B.

		Ft.	In.
Sandstone, massive, visible.....		10	0
Coal, soft, columnar (to shale floor).....		2	6

The two following openings were examined by the writer:

Coal Opening—No. 661 on Map II.

On east hillside of Rockcastle Creek, 0.5 mile northeast of Pineville; **Beckley Coal**; elevation, 1460' B.

			Ft.	In.
Sandstone, white and hard, visible.....			8	0
Coal, soft.....	0'	9"		
"Mother" coal.....	0	0 $\frac{1}{4}$		
Coal, soft, columnar (to slate floor)	1	9	2	6 $\frac{1}{4}$

Coal Opening—No. 662 on Map II.

On north hillside of Guyandot River, 0.3 mile southeast of Pineville; **Beckley Coal**; elevation, 1475' B.

		Ft.	In.
Sandstone, massive, Lower Raleigh , visible.....		25	0
Coal , soft.....	1' 0"		
Coal , gray, harder.....	0 4		
Coal , soft.....	1 0	2	4
<hr/>			
Shale		1	0
Sandstone, making cliff, Quinnimont , 30' 0" to....		40	0

The following exposure was examined by Gawthrop:

Coal Opening—No. 663 on Map II.

On west hillside of Pinnacle Creek, 1 mile southeast of Pineville; **Beckley Coal**; elevation, 1465' B.

		Ft.	In.
Shale, gray, silicious.....			
Coal , medium soft, columnar.....	1' 8"		
Shale, gray.....	0 8		
Coal , soft, columnar.....	0 11	3	3
<hr/>			
Shale and concealed.....			

The two following openings were examined by the writer in the same District:

Coal Opening—No. 68 on Map II.

On north hillside of Bearhole Fork, 1.3 miles northeast of Pineville, just above mouth of Bird Branch; **Beckley Coal**; elevation, 1479' L.

		Ft.	In.
Sandstone, massive, grayish white, Lower Raleigh , visible		20	0
Coal , soft, columnar.....	0' 7"		
"Mother" coal, 1/8" to.....	0 0 1/4		
Coal , soft, columnar.....	1 10	2	5 1/4
<hr/>			
Shale and concealed by hand level measure to top of Coal Test Boring No. 16 on Map II.....		75	0

A sample for analysis was collected from the entire bed section at the above opening, the composition of which is published under **No. 68** in the first table of coal analyses at the end of this Chapter.

Coal Opening—No. 664 on Map II.

In ravine, 0.7 mile northwest of mouth of Cabin Creek, 4 miles east of Pineville; **Beckley Coal**; elevation, 1640' B.

			Ft.	In.
Shale, gray, visible.....			1	0
Coal, soft, columnar.....	0'	6"		
Slate, gray.....	0	1		
Coal, soft, columnar.....	0	2½		
Slate, gray.....	0	0½		
Coal, soft, columnar (shale floor)	2	3	3	1

The following opening was examined by Gawthrop:

Coal Opening—No. 665 on Map II.

On south hillside, 0.8 mile up Smith Branch, 4.1 miles southeast of Pineville; **Beckley Coal**; elevation, 1680' B.

			Ft.	In.
Shale, dark, flaggy, visible.....			5	0
Coal, medium soft, columnar (black slate floor) ..			2	6

In the western edge of Center District, the two following openings were examined by the writer:

Coal Opening—No. 666 on Map II.

On south bank of Wolfpen Branch, 0.4 mile northeast of Mulberry; **Beckley Coal**; elevation, 1315' B.

			Ft.	In.
Sandstone, massive, Lower Raleigh , visible.....			10	0
Coal, soft.....	0'	3½"		
Slate, dark	0	0½		
Coal, soft.....	1	1	1	5
Sandstone, to bed of Wolfpen Branch.....			5	0

Coal Opening—No. 667 on Map II.

On Lick Branch of Indian Creek, 0.3 mile southeast of Mulberry; **Beckley Coal**; elevation, 1300' B.

			Ft.	In.
Sandstone, massive, visible.....			6	0
Coal, soft (sandstone floor).....			1	4

The two foregoing openings are near the western boundary of the minable area of the Beckley bed as outlined on Figure 25.

Farther up Indian Creek, the two following openings were examined by Gawthrop:

Coal Exposure—No. 668 on Map II.

In drain on south side of Indian Creek, $\frac{3}{4}$ mile west of mouth of Hurricane Branch; **Beckley Coal**; elevation, 1415' B.

	Ft.	In.
Coal, thickness concealed, but reported by John Morgan	2	0

Coal Opening—No. 669 on Map II.

On north bank of Indian Creek, 0.3 mile northwest of mouth of Fort Branch; **Beckley Coal**; elevation, 1670' B.

	Ft.	In.
Concealed		
Coal	0'	10"
Shale, dark.....	3	6
Slate, coaly.....	1	0
Coal	0	6
Slate	0	1
Coal	0	8
Coal, concealed, reported.....	1	0
	7	7

Barkers Ridge District, Wyoming County.

In Barkers Ridge District, the Beckley Coal crops high up near the ridge summits as shown on Map II. It has been opened at country banks by natives for domestic fuel and prospected to some extent by the large land holding companies. In the extreme western point, the following opening was examined by Gawthrop:

Coal Opening—No. 670 on Map II.

On north hillside of Pinnacle Creek, 0.7 mile northeast of mouth of Baldwin Branch and $1\frac{1}{4}$ miles southeast of Pineville; **Beckley Coal**; elevation, 1485' B.

	Ft.	In.
Shale, gray, silicious, visible.....	10	0
Coal, soft, columnar (shale floor).....	2	2

At Coal Exposure No. 671 on Map II, in the hill road on the head of Little Whiteoak Creek, the writer observed a heavy blossom at the roadside at an elevation of 1870' B., that appears to come at the Beckley horizon.

The following opening was examined by Gawthrop:

Coal Opening—No. 672 on Map II.

Edge of hill road, north side of Spider Creek, 2.1 miles southwest of Bud; **Beckley Coal**; elevation, 1965' B.

		Ft.	In.
Sandstone, flaggy.....			
Coal, visible.....	1' 6"		
Coal, concealed, reported.....	0 6	2	0

The five following exposures were examined by the writer:

Coal Opening—No. 673 on Map II.

On east edge of road, 1 mile southwest of Micajah and 1½ miles northwest of Bailey Chapel; **Beckley Coal**; elevation, 2790' B.

	Ft.	In.
Sandstone, massive, grayish white, for roof.....		
Coal, concealed, opening closed, but from height of posts, apparently 3' 0" to.....	4	0

Coal Exposure No. 674 on Map II, in the ridge road, 1.8 miles eastward from Herndon, at an elevation of 2755' B., appears to represent the Beckley bed. Its thickness here was not determined.

The Beckley bed makes a heavy bloom in the road at **Coal Exposure No. 675 on Map II**, 3.4 miles northeast of Clarks Gap and ¼ mile southward from Black, at an elevation of 3130' B.

Coal Opening—No. 676 on Map II:

Edge of hill road, 0.9 mile northeast of Herndon; **Beckley Coal**; elevation, 2470' B.

	Ft.	In.
Shale, dark gray, silicious.....	10	0
Coal, soft, columnar, Beckley	2	0
Shale and concealed.....	25	0
Coal (to shale).....	0	3

Tollison Lusk Coal Opening—No. 677 on Map II.

Near residence, 0.4 mile northeast of Opening No. 676; **Beckley Coal**; elevation, 2510' B.

	Ft.	In.
Coal blossom.....	0	6
Sandstone, shaly, full of plant fossils.....	5	0
Coal, columnar, cannel.....	0' 7"	
Coal, soft.....	1 8	
Fire clay shale.....	1 3	
Coal, soft (slate floor).....	0 7	4 1

The four following openings were examined by Gawthrop:

Coal Opening—No. 678 on Map II.

On east side of road, edge of Raleigh County, 0.8 mile southeast of Basin; **Beckley Coal**; elevation, 2830' B.

		Ft.	In.
Sandstone, shaly.....			
Coal, soft, columnar.....	1' 7"		
Shale, gray.....	0 8		
Coal	0 3		
Shale	0 10		
Coal (shale and concealed floor)	0 1	3	5

Coal Opening—No. 679 on Map II.

In ridge road on County Line, 1.1 miles northwest of Basin; **Beckley Coal**; elevation, 2570' B.

		Ft.	In.
Concealed			
Coal	2' 4"		
Fire clay, white.....	0 1		
Coal	1 0		
Fire clay shale, gray.....	0 5		
Coal (fire clay floor).....	5	4	3

Coal Opening—No. 680 on Map II.

On head of Comer Branch, 0.5 mile southwest of Opening No. 679 on Map II; **Beckley Coal**; elevation, 2535' B.

		Ft.	In.
Coal, columnar, weathered....	1' 8"		
Shale, gray.....	0 5		
Coal, columnar, weathered (shale floor).....	1 2	3	3

Coal Opening—No. 681 on Map II.

On waters of Big Branch, just east of ridge road, 2.4 miles southeast of Mullens; **Beckley Coal**; elevation, 2085' B.

		Ft.	In.
Shale, dark, silicious, visible.....		5	0
Coal, medium hard, columnar.	0' 6"		
Coal, grayish.....	0 5		
Coal, blocky (dark shale floor)	1 1	2	0

The following opening in the southern edge of Barkers Ridge District was examined by Gawthrop:

Coal Opening—No. 722 on Map II.

On extreme head of Little Pinnacle Creek, 1 mile northwest of Crumpler; **Beckley Coal**; elevation, 2860' B.

		Ft.	In.
Sandstone, massive, visible.....		8	0
Coal , soft.....	1' 0"		
Fire clay shale.....	1 8		
Coal , soft.....	2 7	5	3
Concealed by water.....			

Sandy River District, McDowell County.

In Sandy River District, the Beckley Coal lies below drainage, hence the information as to its thickness and character is very meager. Along the eastern border it is reported with minable dimensions in the logs of Coal Test Borings Nos. 37, 38 and 39 on Map II, published in Chapter IV in connection with the sections for Harman Branch, Avondale and Bradshaw, pages 93, 93-6 and 96-9, respectively. These records constitute the authority for the minable area of the Beckley bed in this portion of the District as indicated on Figure 25.

Browns Creek District, Wyoming County.

In Browns Creek District, the Beckley Coal has been mined commercially in the southwest border on Spice Creek, where it is known locally as the "War Creek" seam. The two following operations in this region were examined by Gawthrop:

Flanagan Coal Co. No. 1—No. 69 on Map II.

Browns Creek District, at Erin; Beckley ("War Creek") Coal.		Ft.	In.
1. Concealed			
2. Sandstone		5	0
3. Coal , soft, columnar.....	1' 0"		
4. Coal , medium soft, with sulphur streaks.....	0 8		
5. Coal , medium soft.....	0 10		
6. Bone	0 6		

			Ft.	In.
7. Coal, medium hard, columnar	1	0		
8. Coal, harder, columnar....	1	6	5	6
9. Slate and concealed.....				

"Tidal elevation, 1215' H. L.; principal office, Shenandoah, Pa.; daily capacity, 200 tons; daily output, 150 tons; 8 laborers and 18 miners employed; mule and rope haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5, 7 and 8 of section at face of 1st Right Heading off 2nd Left Heading, by R. M. Gawthrop; E. Rippeth, Foreman, authority for data."

The composition of the sample from the above mine is published under **No. 69** in the first table of coal analyses at the end of this Chapter.

Davy Pocahontas Coal Co. No. 1—No. 153 on Map II.

Browns Creek District, at Erin; **Beckley ("War Creek") Coal.**

			Ft.	In.
1. Concealed and sandstone.....				
2. Coal, soft.....	0'	5½"		
3. Sulphur	0	0½		
4. Coal, with sulphur streaks.	0	5		
5. Coal, medium soft.....	2	3		
6. Bone	0	8		
7. Coal, medium hard.....	1	3		
8. Coal, bony, 0' 6" to.....	0	1	5	2
9. Shale and concealed.....				

"Tidal elevation, 1205.3' L.; coal owned by Davy Pocahontas Coal Co.; principal office, Baltimore, Md.; daily capacity, 500 tons; daily output, 400 tons; 18 laborers and 40 miners employed; mule and electric haulage; used mostly for steam, some domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; P. A. Grady, Superintendent, authority for data."

The composition and calorific value of a sample from the above mine, as determined by the U. S. Bureau of Mines, is republished under **No. 153** in the second table of coal analyses at the end of this Chapter.

In the same District, the thickness and stratigraphic position of the Beckley Coal are exhibited in the logs of Coal Test Borings Nos. 45A and 52, and in the Cub Branch-Pando Section, pages 296, 301, and 104, respectively.

The five following exposures along Tug Fork were examined by the writer:

Coal Exposure—No. 683 on Map II.

On north bank of Tug Fork, 0.2 mile southeast of Twin Branch Station; **Beckley ("War Creek") Coal**; elevation, 1185' B.

		Ft.	In.
Sandstone			
Coal, soft.....	1' 10"		
Fire clay shale, dark.....	0 9		
Coal, soft, (slate floor).....	2 3	4	10

Coal Exposure—No. 684 on Map II.

At east portal of first N. & W. R. R. tunnel southwest of Davy; **Beckley ("War Creek") Coal**; elevation, 1180' B.

		Ft.	In.
Sandstone, massive, Lower Raleigh		70	0
Coal, soft.....	1' 10"		
Coal, bony.....	0 5		
Slate, gray.....	0 10		
Coal to grade, (floor concealed) 0 6		3	7

Coal Exposure—No. 685 on Map II.

At Davy, in railway cut just east of mouth of Davy Branch; **Beckley ("War Creek") Coal**; elevation, 1210' B.

	Feet.
Sandstone, Lower Raleigh , visible.....	15
Coal, soft, 30" to.....	3
Fire clay shale.....	15
Sandstone, Quinnimont , to railroad grade.....	10

Coal Exposure—No. 686 on Map II.

Southeast of Davy, edge of road, $\frac{1}{4}$ mile southeast of mouth of Jenny Branch; **Beckley ("War Creek") Coal**; elevation, 1305' B.

		Ft.	In.
Sandstone, making great cliff, Lower Raleigh		70	0
Coal, with thin slate lamina-			
tions	0' 4"		
Coal, soft, 28" to.....	2 8		
Fire clay shale, dark.....	2 5		
Coal, slaty.....	1 4		
Slate, coaly (slate floor).....	0 5	7	2

Coal Exposure—No. 687 on Map II.

Edge of road, northeast of Deegans, due north of mouth of Lick Branch; **Beckley ("War Creek") Coal**; elevation, 1420' B.

	Ft.	In.
Sandstone, making great cliff, Lower Raleigh	60	0
Coal , slaty.....0' 4"		
Coal , soft (concealed floor)...1 8	2	0

In the eastern portion of Browns Creek District, Gawthrop examined the following opening in what appears to be this bed, since it belongs slightly over 500 feet above the No. 3 Pocahontas seam in Coal Test Boring No. 60 on Map II in the immediate vicinity:

Coal Opening—No. 688 on Map II.

On north bank of Browns Creek, 2.5 miles northeast of Welch; **Beckley ("War Creek") Coal**; elevation, 1594' L.

	Ft.	In.
Sandstone, Lower Raleigh , visible.....	5	0
Shale, coaly.....0' 6"		
Coal , soft, columnar.....2 2	2	8

Shale, and concealed, to bed of Browns Creek....	10	0
--	----	---

Big Creek District, McDowell County.

In Big Creek District, the Beckley Coal has been mined quite extensively on a commercial scale along the waters of Dry Fork, and War Creek, where it has long been known locally as the "**War Creek**" bed. Its thickness and stratigraphic position are exhibited in the Coalwood, Dry Fork, Jacob Fork and Bearwallow Knob Sections, published in Chapter IV, and in the logs of Coal Test Borings Nos. 65 and 107, on preceding pages of this Chapter. It has also been prospected to some extent by the large land holding companies and by natives for local domestic fuel. The six following commercial mines along Dry Fork were examined and sampled by Gawthrop during 1914:

Flat Top Coal Mining Co. (Thomas)—No. 70 on Map II.

Big Creek District, 0.5 mile south of English; Beckley ("War Creek") Coal.

		Ft.	In.
1.	Concealed and sandstone.....		
2.	Shale, silicious, 16' 0" to.....	2	0
3.	Coal, soft, columnar.....1' 0"		
4.	Coal, medium soft.....1 8		
5.	Coal, soft (slate floor and concealed) .....1 0	3	8

"Tidal elevation, 1260' B.; coal owned by Flat Top Coal Mining Co.; principal office, Bramwell; daily capacity, 400 tons; daily output, 300 tons; 35 laborers and 55 miners employed; mule and electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 3, 4 and 5 of section, at face of 2nd Right Heading, by R. M. Gawthrop; James Grainger, Superintendent, authority for data."

The composition of the sample from the above mine is published under No. 70 in the table of coal analyses at the end of this Chapter.

Yukon Coal Co. No. 2 Mine—No. 71 on Map II.

Big Creek District, 0.7 mile west of Dry Fork; Beckley ("War Creek") Coal.

		Ft.	In.
1.	Concealed		
2.	Shale, bluish gray.....	10	0
3.	Coal, medium soft, colum- nar .....1' 4"		
4.	Coal, soft, columnar.....1 0		
5.	Coal, harder, columnar....1 5	3	9
6.	Slate and concealed.....		

"Tidal elevation, 1285' B.; coal owned by Yukon Coal Co.; principal office Yukon; daily capacity, 60 tons; daily output, 40 tons; 8 laborers and 8 miners employed; mule haulage; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 3, 4 and 5 of section on chain pillar of Main Heading, by R. M. Gawthrop."

The composition of the sample from the above mine is published under No. 71 in the table of coal analyses at the end of this Chapter.

Buchanan Coal Co. Mine—No. 72 on Map II.

Big Creek District; on north side of Dry Fork at Dry Fork;
Beckley ("War Creek") Coal.

			Ft.	In.
1. Concealed				
2. Shale, bluish gray.....				
3. Coal, medium soft, columnar	1'	0"		
4. Coal, soft, columnar.....	1	2		
5. Coal, medium hard, columnar	1	0	3	2
6. Shale and concealed.....				

"Tidal elevation, 1325' B.; coal owned by Buchanan Coal Co.; principal office, Grundy, Va.; daily capacity, 175 tons; daily output, 150 tons; 11 laborers and 22 miners employed; mule and gasoline motor haulage; used for steam and domestic fuel; shipped East and West; no butts or faces; greatest rise, southeast; sample collected from Nos. 3, 4 and 5 of section in Room No. 6 off 1st Right Heading, by R. M. Gawthrop; M. A. Hurley, Foreman, authority for data. Coal varies from 3' 0" to 4' 0" in working places. Squeezes down to 2' 0" in roll."

The composition of the sample from the above mine is published under No. 72 in the table of coal analyses at the end of this Chapter.

Dry Fork Colliery Co. Mine—No. 73 on Map II.

Big Creek District; on south side of Dry Fork, at Dry Fork;
Beckley ("War Creek") Coal.

			Ft.	In.
1. Concealed				
2. Shale, bluish gray.....			8	0
3. Coal, medium soft.....	1'	6 "		
4. Sulphur, 0" to.....	0	0½		
5. Coal, medium soft.....	1	9½		
6. Coal, harder.....	1	5		
7. Black rash, 0" to.....	1	0	5	9
8. Slate and concealed.....				

"Tidal elevation, 1285' L.; coal owned by George Lambert, Walter Taylor et al. principal office, Bluefield; daily capacity, 800 tons; daily output, 550 tons; 18 laborers and 40 miners employed; mule and electric haulage; used for steam and domestic fuel; shipped East and West; no butts or faces; greatest rise, southeast; sample collected from Nos. 3, 5 and 6 of section in Room No. 1 off Main Dip Heading, by R. M. Gawthrop; W. H. Powell, Foreman, authority for data. Note.—No. 6 of section is shipped separately as domestic fuel. Coal varies from 4' 0" to 8' 0" in working places; squeezes down to 2' 0" in rolls."

The composition of the sample from the above mine is published under No. 73 in the table of coal analyses at the end of this Chapter.

Excelsior Pocahontas Coal Co. Mine—No. 75 on Map II.

Big Creek District; at Excelsior; Beckley ("War Creek") Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		5	0
3.	Coal, soft, columnar.....	0' 6"		
4.	Sulphur band, 0½" to.....	0		
5.	Coal, soft, columnar.....	1 6		
6.	Coal, medium soft, columnar	2 0		
7.	Bone coal.....	0 1	4	1
8.	Shale and concealed.....			

"Tidal elevation, 1400' B.; coal owned by New River and Pocahontas Consolidated Coal Co.; principal office, Excelsior; daily capacity, 0 tons; daily output, 500 tons; 18 laborers and 60 miners employed; electric haulage; used for steam on N. & W. Ry.; shipped to Bluefield; butts, N. 35° W.; face, N. 55° E.; greatest rise, southeast; sample collected from Nos. 3, 5 and 6 of section at face of 6th Right Air Course, by R. M. Gawthrop; M. C. Roberts, Foreman, authority for data."

The composition of the sample from the above mine is published under **No. 75** in the table of coal analyses at the end of this Chapter.

Pocahontas Domestic Coal Co. Mine—No. 77 on Map II.

Big Creek District; 0.1 mile north of War; Beckley ("War Creek") Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		5	0
3.	Coal, medium soft.....	1' 0"		
4.	Coal, soft.....	1 0		
5.	Coal, medium soft.....	1 0		
6.	Coal, soft.....	0 10	3	10
7.	Bone and concealed.....			

"Tidal elevation, 1500' B.; coal owned by Berwind Coal & Coke Co.; principal office, War; daily capacity, 400 tons; daily output 350 tons; 12 laborers and 50 miners employed; mule and electric haulage; used mostly for domestic purposes, some steam; shipped West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 3, 4, 5 and 6 of section at face of 6th Cross Entry off 1st Right Heading, by R. M. Gawthrop; G. C. Cline, Foreman, authority for data."

The composition of the sample from the above mine is published under **No. 77** in the table of coal analyses at the end of this Chapter.

The following commercial mine on War Creek, visited and sampled by Gawthrop, is typical of this bed where it received the local designation, "War Creek":



PLATE XXVII—Showing outcrop of the No. 3 Pocahontas Coal
along the N. & W. R. R. at Coaldale—9' 6" thick.

Photo by A. T. Bragonier.

Warrior Coal Co. Mine—No. 76 on Map II.

Big Creek District; 1.1 miles southwest of War; Beckley ("War Creek") Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		5	0
3.	Coal, soft, columnar.....	0' 7 "		
4.	Sulphur, 0" to.....	0 0½		
5.	Coal, soft, columnar.....	2 0		
6.	Coal, medium soft, columnar	2 2½		
7.	Coal, bony.....	0 6	5	4
8.	Shale and concealed.....			

"Tidal elevation, 1450' B.; coal owned by Charles Fudge; principal office, War; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 3 and 6 of section at face of Main Entry 50 feet from pit mouth, by R. M. Gawthrop; B. C. Cordle, Foreman, authority for data. Mine is just being opened."

The composition of the sample from the above mine is published under No. 76 in the first table of coal analyses at the end of this Chapter.

The three following commercial mines on this bed in the same District, on Barrenshe Creek, Johns Branch and Dry Fork, were examined by Gawthrop, but the tabulated analyses from the same are results republished from determinations made by the U. S. Bureau of Mines:

Carter Coal Co. Mine No. 5—No. 154 on Map II.

Big Creek District; 0.3 mile east of Caretta; Beckley ("War Creek") Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		6	0
3.	Coal, medium soft, columnar	2' 3 "		
4.	Sulphur band, 0" to.....	0 0½		
5.	Coal, harder, columnar ..	1 0½		
6.	Coal, bony.....	0 2		
7.	Coal, medium hard.....	1 0	4	6
8.	Slate, reported.....		0	1
9.	Coal, reported (to shale).....		0	3

"Tidal elevation, 1474' L.; coal owned by Carter Coal Co.; principal office, Johnston City, Tenn.; daily capacity, 1000 tons; daily output, 800 tons; 50 laborers and 70 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; James Golden, Superintendent, authority for data."

The composition and calorific value of a sample of coal from the above mine is published under **No. 154** in the second table of analyses at the end of this Chapter.

Johns Branch Coal Co. Mine—No. 155 on Map II.

Big Creek District; 0.8 mile northeast of War; Beckley ("War Creek") Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		5	0
3.	Coal, medium soft.....	0' 3½"		
4.	Coal, gray.....	0 1½		
5.	Coal, medium soft.....	1 4		
6.	Sulphur, 0" to.....	0 0¼		
7.	Coal, soft.....	0 8		
8.	Sulphur	0 0¼		
9.	Coal, medium hard.....	0 8½		
10.	Coal, soft.....	0 10		
11.	Coal, bony.....	0 8	4	8
12.	Slate and concealed.....			

"Tidal elevation, 1540' B.; coal owned by Johns Branch Coal Co.; principal office, Yukon; daily capacity, 300 tons; daily output, 100 tons; 12 laborers and 27 miners employed; mule haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; J. E. Fletcher, Foreman, authority for data."

The composition of a sample of coal from the above mine as determined by the U. S. Bureau of Mines is republished under **No. 155** in the second table of coal analyses at the end of this Chapter.

War Creek Coal Co. Mine—No. 156 on Map II.

Big Creek District; 0.1 mile southeast of War; Beckley ("War Creek") Coal.

			Ft.	In.
1.	Concealed			
2.	Shale, bluish gray.....		10	0
3.	Coal, soft, columnar.....	0' 3"		
4.	Coal, gray	0 1		
5.	Coal, medium soft, columnar.....	1 6		
6.	Coal, soft, columnar.....	1 0		
7.	Coal, medium soft, columnar	1 5	4	3
8.	Bone coal, reported from 0' 8" to 1' 6"; not mined, except in heading.			

"Tidal elevation, 1505' B.; coal owned by Mrs. Crosby Whitley; principal office, Yukon; daily capacity, 300 tons; daily output, 200 tons; 18 laborers and 40 miners employed; mule haulage; used for steam; shipped West to Lakes in summer, East to Lamberts Point in winter; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; O. E. Linkons, Storekeeper, authority for data."

The composition of a sample of coal from the above mine, as determined by the U. S. Bureau of Mines, is republished under **No. 156** in the second table of coal analyses at the end of this Chapter.

The **Yukon Coal Co. No. 1 Mine—No. 74 on Map II**, on the west bank of Dry Fork, 0.4 mile southward from English, at an elevation of 1385' B., in the Beckley ("War Creek") bed, was sampled by the writer previous to 1914, as shown on page 197 of Volume II(A) of the State Geological Survey Reports. The composition is republished under **No. 74** in the first table of coal analyses at the end of this Chapter. The Beckley ("War Creek") Coal from the foregoing commercial mines in Big Creek District has an excellent reputation as a steam and domestic fuel. Its condition at crop exposures and prospect openings will now be described, the two following diggings having been examined by Gawthrop:

Coal Opening—No. 689 on Map II.

On west bank of Barrenshe Creek, 0.4 mile northwest of Yukon; Beckley ("War Creek") Coal; elevation, 1380' B.

	Ft.	In.
Sandstone, flaggy, visible.....	5	0
Slate, silicious.....	1	6
Coal, medium soft.....2' 8"		
Coal, harder (to shale floor).1 0	3	8

Coal Opening—No. 690 on Map II.

On east bank of War Creek, 1¼ miles northwest of Berwind; Beckley ("War Creek") Coal; elevation, 1465' B.

	Ft.	In.
Shale, buff, visible.....	2	6
Coal, medium soft (to slate floor).....	6	0

The following opening was examined by Gawthrop:

Coal Opening—No. 691 on Map II.

On south side of branch of Dry Fork, 0.8 mile northwest of Berwind; **Beckley ("War Creek") Coal**; elevation, 1735' B.

			Ft.	In.
Shale, gray, silicious.....			10	0
Coal, medium soft, columnar..	2'	2"		
Slate	0	1		
Coal, harder, columnar (to shale floor)	1	3	3	6

The four following openings on the waters of Big Creek were examined by Gawthrop:

Coal Prospect—No. 692 on Map II.

On north side branch of Big Creek, 1 mile northwest of mouth of Mountain Fork; **Beckley ("War Creek") Coal**; elevation, 1725' B.

			Ft.	In.
Shale, gray, silicious, visible.....			15	0
Coal, soft, columnar.....	0'	9"		
Shale, gray.....	1	0		
Coal, columnar, medium soft..	1	3		
Coal, columnar, harder.....	2	3	5	3

Shale and concealed to top of Boring No. 123 on Map II.....	110	0
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Coal Prospect No. 693 on Map II, in the Beckley ("War Creek") Coal, at an elevation of 1895' B., on the south hillside of Big Creek, 0.4 mile southwest of the mouth of Mountain Fork, had fallen shut in 1914, but the seam is reported by C. L. Hicks to be 6 feet in thickness, without partings.

Coal Opening—No. 694 on Map II.

On point immediately northeast of mouth of Split Fork, 3.2 miles east of Caretta; **Beckley ("War Creek") Coal**; elevation, 1775' B.

			Ft.	In.
Shale, gray, silicious.....			10	0
Coal, soft, columnar.....	1'	0"		
Coal, slaty.....	0	1		
Coal, medium soft, columnar..	3	6		
Slate, dark, bony.....	0	6		
Coal, medium soft, columnar..	1	2		
Coal, harder.....	2	4	8	7
Shale and concealed.....			5	0
Sandstone, massive.....			15	0

Coal Prospect No. 695 on Map II, in the Beckley ("War Creek") Coal, on a north branch of Split Fork, 0.7 mile north-east of Opening No. 694 above described, at an elevation of 1855' B., was closed, but the seam is reported 7 feet in thickness.

The following opening was examined by Gawthrop in the extreme southeast edge of Big Creek District:

Faraday Coal Co. Prospect—No. 696 on Map II.

In drain on north hillside of Horsepen Creek, 0.9 mile northwest of Horsepen; Beckley ("War Creek") Coal; elevation, 2500' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Coal, soft.....0'	3"		
Fire clay shale.....0	1		
Coal, soft, columnar.....3	3		
Slaty shale, black.....0	8		
Bone	4		
Coal, medium soft.....0	6		
Bone	1		
Coal, harder.....0	3	5	5
<hr/>			
Shale and concealed.....			

Adkin District, McDowell County.

In Adkin District, the Beckley Coal has not been mined commercially, but it has been prospected by the large land holding companies to some extent and by natives for domestic fuel. The two following openings along the western border were examined by Gawthrop:

Coal Opening—No. 697 on Map II.

On the north bank of Sugarcamp Branch, 1.6 miles due west of Wilcoe; Beckley ("War Creek") Coal; elevation, 1670' B.

		Ft.	In.
Sandstone, shaly, visible.....		10	0
Coal, slaty.....0'	6"		
Coal, soft, columnar.....2	0		
Coal, harder, columnar.....1	0		
Shale, gray.....0	4		
Coal, soft, visible.....1	10	5	6
<hr/>			
Coal, thickness concealed.....			

Coal Prospect No. 697A on Map II, in the Beckley ("War Creek") bed, at an elevation of 1925' B., on the head of Left Fork of Mill Creek, 2.3 miles southwest of Gary, was closed in 1914, but the seam is reported to have a thickness of about 6 feet.

North Fork and Elkhorn Districts, McDowell County.

In North Fork and Elkhorn Districts, the Beckley Coal has not been opened to any extent, since it outcrops high up on the mountain slopes in a region where all the mining efforts are devoted to taking out the great **No. 3 Pocahontas seam**. It is believed to be present in minable thickness and regularity in the areas outlined for this coal on Figure 25.

Quantity of Beckley ("War Creek") Coal Available.

Based on the foregoing evidence and a planimetric determination of the area by Gawthrop from Map II as this bed is limited on Figure 25, the following estimate is made for the amount of Beckley ("War Creek") Coal available:

Probable Amount of Beckley Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Oceana.....	2	3.0	1,920	167,270,400	6,690,816
Baileysville....	2	1.0	640	55,756,800	2,230,272
Slab Fork.....	2	64.0	40,960	3,568,435,200	142,737,408
Center.....	2	72.0	46,080	4,014,489,600	160,579,584
Barkers Ridge.	2	31.0	19,840	1,728,460,800	69,138,432
Totals.....		171.0	109,440	9,534,412,800	391,376,512
McDowell:					
Sandy River...	3	25.0	16,000	2,090,880,000	83,635,200
Browns Creek.	3	60.0	38,400	5,018,112,000	200,724,480
Big Creek.....	3	95.0	60,800	7,945,344,000	317,813,760
Adkin.....	3	12.0	7,680	1,003,622,400	40,144,896
North Fork....	2	6.0	3,840	334,540,800	13,381,632
Elkhorn.....	2	1.0	640	55,756,800	2,230,272
Totals.....		199.0	127,360	16,448,256,000	657,930,240
Totals for Both Counties		370.0	236,800	16,982,668,800	1,039,306,752

THE FIRE CREEK COAL.

The Fire Creek Coal, described in Chapter VI, pages 209-10, is of secondary importance, its approximate minable area, as also its western boundary line, west of which it is not believed to attain minable dimensions, is outlined on Figure 26. It appears to attain its best development from the standpoint of regularity of bed-section in Slab Fork and Barkers Ridge Districts, Wyoming, and it has never been mined commercially in either County, although prospected by large land holding companies and natives for domestic fuel. In McDowell it is very irregular in thickness, and consequently there are probably many barren patches within the minable area as limited on Figure 26. Its description will now be taken up by magisterial Districts.

Slab Fork District, Wyoming County.

In Slab Fork, the Fire Creek Coal lies below drainage over the major portion of the District, and appears to attain here the best development in the territory of this Report. Its thickness and stratigraphic position are shown in the Maben and Maben-Southwest Sections in Chapter IV, pages 69 and 70-2, respectively, and in the logs of Coal Test Borings Nos. 1 and 3-13, inclusive, on Map II, published in detail on preceding pages of this Chapter, as also in the table of borings for Wyoming County, page 268. Samples of the core from this bed in Borings Nos. 3, 6 and 7 on Map II were analyzed, the compositions of which, as reported by E. M. Merrill, of Beckley, West Virginia, are as follows:

	No. 3 on Map II.	No. 6 on Map II.	No. 7 on Map II.
Moisture	0.52	0.48	0.41
Volatile Matter.....	17.87	14.65	16.79
Fixed Carbon.....	77.87	81.00	77.92
Ash	3.74	3.87	4.88
Totals.....	100.00	100.00	100.00
Sulphur	0.59	0.63	0.57
Phosphorus	—	0.0021	0.0078
B. T. U.....	—	15,118	14,945

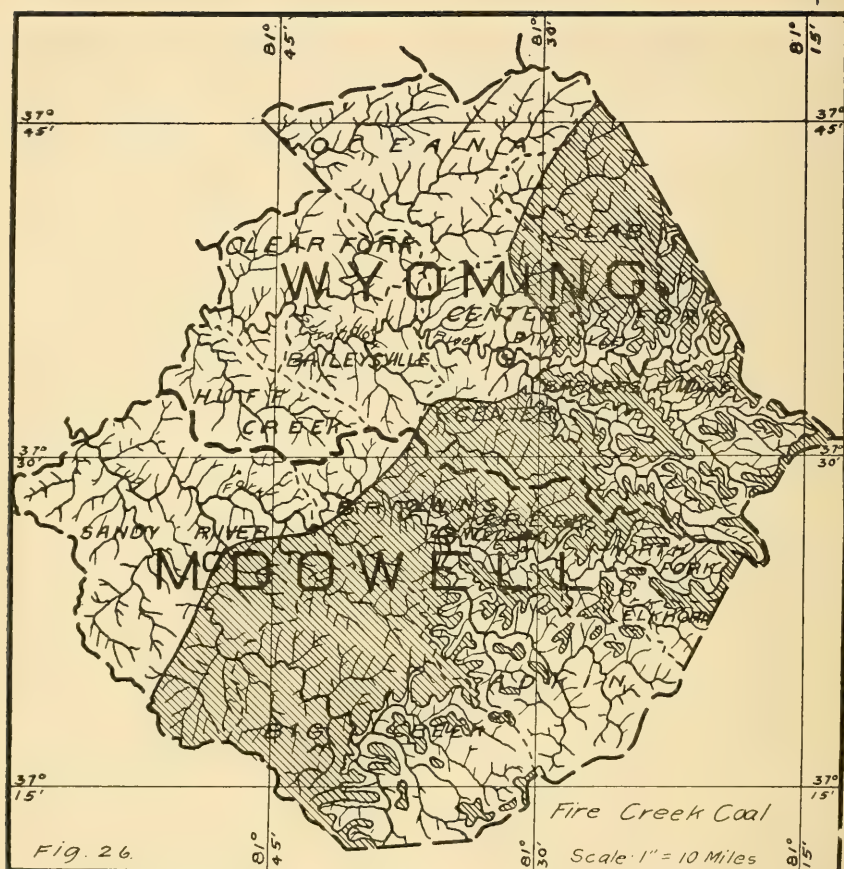


Figure 26—Showing Approximate Minable Area of the Fire Creek Coal (See explanations in Author's Preface).

The foregoing results show the Fire Creek to be a high grade coal, comparing favorably with the same bed in the New River region, where it was first named and has long been mined commercially.

The seven following exposures at country banks, prospect openings and outcrop, were examined by the writer:

Coal Exposure—No. 698 on Map II.

Edge of Raleigh County, at Hotchkiss; north bank of Slab Fork, just below the mouth of Grave Fork; **Fire Creek Coal**; elevation, 1720' B.

	Ft.	In.
Sandstone, making cliff, Lower Raleigh , visible..	20	0
Shale, sandy.....	10	0
Concealed, Beckley Coal horizon	10	0
Shale, sandy, dark, laminated, Quinnimont	30	0
Slate, black, with fossil calamite stems.....	1	0
Coal , slaty.....0' 4"		
Coal , soft, columnar.....3 2 Fire Creek .	3	6
Slate		

Only 10 feet southwest of this point, 3 feet of black slate develops 12 inches below the top of the Fire Creek Coal.

Coal Exposure—No. 699 on Map II.

On north edge of Virginian Railway, 0.6 mile southwest of Hotchkiss; **Fire Creek Coal**; elevation, 1685' B.

	Ft.	In.
Sandstone, Quinnimont	20	0
Concealed, mostly dark shale, Quinnimont	35	0
Coal blossom , heavy, thickness concealed, 0' to...	3	0
Fire clay shale.....	4	0

Coal Opening—No. 700 on Map II.

On south bank of Slab Fork, 0.7 mile southwest of Hotchkiss; **Fire Creek Coal**; elevation, 1695' B.

	Ft.	In.
Slate, black, visible, fossil plants abundant, with trace of coal.....	2	0
Coal , soft, columnar.....2' 5"		
Slate, gray.....0 1		
Coal , slaty.....0 4	2	10
Slate and concealed to bed of Slab Fork.....	30	0

Coal Opening—No. 701 on Map II.

On north bank of Slab Fork, at mouth of Old Slab Fork; **Fire Creek Coal**; elevation, 1673' L.

	Ft.	In.
Sandstone, massive, visible.....	10	0
Coal , soft, columnar.....	1	0
Fire clay shale, dark (to sandstone).....	3	0

Coal Opening—No. 702 on Map II, in the Fire Creek bed, on the west side of Slab Fork, 0.6 mile south of the opening last described, at an elevation of 1700' B., had fallen shut in 1914.

Coal Opening—No. 703 on Map II.

On west hillside of Slab Fork, 1.5 miles northeast of Maben; **Fire Creek Coal**; elevation, 1715' B.

	Ft.	In.
Shale, dark, flaggy, sandy, visible.....	6	0
Slate, black, calamites and other fossil plants, abundant	2	0
Coal, soft, columnar (to gray shale floor).....	3	0

Coal Opening—No. 704 on Map II.

In bed of branch of Slab Fork, 0.5 mile east of Opening No. 703 on Map II; **Fire Creek Coal**; elevation, 1770' B.

	Ft.	In.
Shale, dark, laminated, Quinnimont , visible.....	20	0
Slate, black, plant fossils abundant.....	3	0
Coal, bony and slaty.....0' 10"		
Coal, soft, columnar (to slate floor) .....3 3	4	1

The writer collected a sample for analysis and obtained the following data at an opening in this bed:

Coal Opening—No. 78 on Map II.

West hillside of Slab Fork, at Maben; **Fire Creek Coal**; elevation, 1730' L.

	Ft.	In.
Sandstone roof.....		
Coal, soft, columnar, Fire Creek , 2' 10" to.....	3	0
Slate and unrecorded.....	133	0
Coal, No. 9 Pocahontas , at Exposure No. 735 on Map II.....	2	10

The composition of the sample from the entire bed section is published under **No. 78** in the first table of coal analyses at the end of this Chapter.

In the southwest edge of Slab Fork District, on the waters of Cabin Creek, the following opening was examined by Gawthrop:

Coal Opening—No. 705 on Map II.

In point just north of mouth of Meadow Fork of Cabin Creek;
Fire Creek Coal; elevation, 1485' B.

			Ft.	In.
Sandstone, massive, roof.....				
Coal, soft, columnar.....	1'	1½"		
Shale, dark.....	0	2½"		
Coal	0	2½"		
Shale, dark.....	0	0½"		
Coal, medium soft, columnar.....	1	11	3	6
Shale				

Center District, Wyoming County.

In Center District, the Fire Creek Coal as a minable bed is confined to the southeast half as shown on Figure 26. In the vicinity of Pineville, it has been largely cut out by the excessive development of the Quinimont Sandstone. The openings in the No. 9 Pocahontas seam, along the road leading up Guyandot River, 2.5 miles east of Pineville, have been mistaken for the Fire Creek Coal, but the Pineville-Sugar Run and Maben-Southwest Sections, published in Chapter IV, pages 74-6 and 70-2, respectively, corroborate the correlation of the coal at these diggings with the former seam. The following is the only exposure of the Fire Creek Coal observed in this District:

Coal Opening—No. 708 on Map II, in run on north side of Guyandot River, $\frac{3}{4}$ mile northwest of the mouth of Cabin Creek, at an elevation of 1540' B., examined by the writer, is in the Fire Creek bed, belonging 100 feet below another—No. 664 on Map II—in the Beckley seam. The digging was closed, so that the coal's thickness was not determined.

Barkers Ridge District, Wyoming County.

In Barkers Ridge District, the Fire Creek Coal has been opened at country banks and prospected quite extensively. Its thickness and stratigraphic position are exhibited in the sections published in Chapter IV for Mullens, Herndon and Clarks Gap. The two following exposures were examined by Gawthrop:

Coal Prospect—No. 709 on Map II.

At road fork on County Line, $\frac{1}{4}$ mile northeast of Basin; **Fire Creek Coal**; elevation, 2650' B.

			Ft.	In.
Concealed				
Coal	0'	7"		
Shale	0	2		
Coal (shale floor and concealed).....	1	6	2	3

Coal Exposure—No. 710 on Map II.

In hill road, south hillside of Guyandot River, 1.7 miles southeast of Mullens; **Fire Creek Coal**; elevation, 1920' B.

Coal, soft, visible.....30 Inches

The following section was given by W. E. Wall of the Pocahontas Coal & Coke Co. at a prospect digging, slightly less than one-half mile due west of Exposure No. 710 above:

Coal Prospect—No. 711 on Map II.

Fire Creek Coal; elevation, 1909' L.

			Ft.	In.
Sandstone, roof.....				
Coal	1'	1 "		
Slate, soft, dark gray.....	0	10 $\frac{1}{2}$		
Coal	1	4 $\frac{1}{2}$		
"Mother" coal.....	0	0 $\frac{1}{4}$		
Coal (to sandstone floor)....	2	5	5	9 $\frac{1}{4}$

The following opening was examined by the writer:

Coal Opening—No. 712 on Map II.

On east hillside of Mill Branch of Barkers Creek, 0.6 mile east of Bud; **Fire Creek Coal**; elevation, 1900' B.

			Ft.	In.
Sandstone, massive, visible.....			5	0
Coal, soft, columnar.....	4'	2"		
Shale, gray, soft.....	0	3		
Coal, soft, columnar, visible....	1	6	5	11

The above opening comes about 410 feet above the No. 3 Pocahontas seam, or at practically the same interval as in the Maben-Southwest Section, in Chapter IV, pages 70-2.

The following opening was examined by Gawthrop:

Coal Opening—No. 713 on Map II.

On east hillside of Gooney Otter Creek, 0.8 mile north of Herndon;
Fire Creek Coal; elevation, 2260' B.

		Ft.	In.
Shale, roof.....			
Coal, hard, blocky.....	0'	9"	
Coal, medium soft.....	1	2	
Slate, coaly.....	0	2	
Coal	0	1	
Slate, coaly.....	0	3	
Coal, slaty.....	0	8	
Coal, soft, columnar.....	0	9	
Shale, hard, gray.....	0	5	
Coal, soft, columnar.....	0	10	
Shale, hard, gray.....	1	5	
Coal, medium soft, columnar...	1	4	
Shale, gray.....	0	1	
Coal, medium soft.....	0	4	8 3
<hr/>			
Shale and concealed.....		5	0

Coal Prospect—No. 714 on Map II, on the east side of the ridge road, 1 mile southward from Herndon, at an elevation of 2555' B., is in the Fire Creek bed. The digging had fallen shut when examined by the writer in 1914.

The Fire Creek is only 15 inches thick at **Coal Exposure No. 715 on Map II**, along the ridge road, 3 miles east of Herndon, and 1.4 miles northwest of Black, at an elevation of 2890' B., as reported by Gawthrop. The 7 following exposures were examined by the writer:

Coal Exposure—No. 716 on Map II.

In ridge road, 3.2 miles northeast of Clarks Gap and 0.4 mile north-east of Pilot Knob; **Fire Creek Coal**; elevation, 3040' B.

Coal, soft, columnar.....18 Inches

William Farley Coal Opening—No. 717 on Map II.

On north slope of Pilot Knob, 2.8 miles northeast of Clarks Gap;
Fire Creek Coal; elevation, 3055' B.

		Ft.	In.
Sandstone, massive.....			
Coal, soft.....	2'	0"	
Slate, black.....	0	2	
Coal	0	4	2 6

Coal Opening—No. 718 on Map II.

Edge of Mercer County, 1.4 miles northeast of Clarks Gap; **Fire Creek Coal**; elevation, 3000' B.

		Ft.	In.
Sandstone			
Coal, soft.....	1' 1"		
Slate, black.....	0 10		
Slate, black, with coal streaks..	0 10		
Coal, soft, columnar.....	2 1		
Slate, gray.....	0 3		
Coal, soft (slate floor).....	0 5	5	6

Coal Exposure—No. 719 on Map II.

In ridge road on County Line, 0.7 mile northeast of Clarks Gap; **Fire Creek Coal**; elevation, 3035' B.

	Ft.	In.
Sandstone, visible.....	35	0
Coal blossom, heavy, about.....	3	0
Fire clay shale.....	5	0

About the same thickness of the Fire Creek bed crops in the sharp bend of the ridge road at **Coal Exposure No. 720 on Map II**, 0.5 mile northeast of Clarks Gap, at an elevation of 3055' B. It is only 17 inches thick at **Coal Exposure No. 721 on Map II**, in the same ridge road, 0.4 mile due north of Clarks Gap, at an elevation of 2950' B.

Sandy River District, McDowell County.

In Sandy River, the Fire Creek Coal lies entirely below drainage, the only information as to its thickness and character being the logs of Coal Test Borings Nos. 38, 39 and 40 on Map II, in the eastern border of the District. The records of the first two are published in connection with the Avondale and Bradshaw Sections, pages 93-6 and 96-9, respectively, and that, for the latter on a preceding page of this Chapter. These constitute the authority for the minable area of the Fire Creek Coal as indicated on Figure 26 for this region.

Browns Creek District, McDowell County.

In Browns Creek District, the Fire Creek Coal has been prospected at several points by natives for domestic fuel. Its thickness and stratigraphic position are exhibited in the Welch Section published in Chapter IV, page 105, and in the log of Coal Test Boring No. 52 on Map II. The two following exposures along Tug Fork were examined by the writer:

Coal Exposure—No. 723 on Map II.

West portal of N. & W. Ry. tunnel at Antler (Deegans); **Fire Creek Coal**; elevation, 1260' B.

	Ft.	In.
Sandstone, shaly, Quinnimont	60	0
Slate, black, calamites and other fossil plants abundant.....	8	0
Coal .....0' 5"		
Slate, black, coaly.....1 4		
Coal , soft.....1 4		
Coal , slaty.....0 3		
Coal .....0 6	3	10
<hr/>		
Slate and sandstone to railway grade.....	15	0

Coal Exposure—No. 724 on Map II.

One mile northwest of Welch, just northeast of west portal of Hemphill Tunnel; **Fire Creek Coal**; elevation, 1410' B.

	Ft.	In.
Sandstone, platy.....	30	0
Concealed, with coal blossom.....	20	0
Shale, sandy, plant fossils abundant.....	15	0
Coal .....0' 2"		
Shale, gray.....0 5		
Coal .....0 8		
Slate and coal.....0 8		
Coal .....0 9		
Coal , slaty.....0 7	3	3
<hr/>		
Shale	2	0
Sandstone, massive, grayish white.....	70	0

The three following exposures in the same District on the waters of Browns Creek were examined by Gawthrop:

Coal Prospect—No. 725 on Map II.

In run, 0.1 mile northwest of mouth of Puncheoncamp Branch of Browns Creek; **Fire Creek Coal**; elevation, 1500' B.

		Ft.	In.
Shale, roof.....			
Coal, slaty.....	0' 6"		
Coal, soft.....	1 10		
Shale, dark.....	0 11		
Coal, soft.....	1 0		
Slate and bone.....	0 8		
Coal, covered by water.....	0 10	5	9

Coal Prospect—No. 726 on Map II.

On the east bank of Puncheoncamp Branch, 0.3 mile northeast of Prospect No. 725; **Fire Creek Coal**; elevation, 1495' B.

		Ft.	In.
Shale, sandy, roof.....			
Coal, soft.....	1' 2"		
Shale, gray, 0" to.....	0 10		
Coal, soft.....	1 8		
Shale.....	1 2		
Coal, soft.....	1 5	6	3
Shale and concealed to branch.....		15	0

Coal Opening—No. 727 on Map II.

On north bank of Browns Creek, 0.3 mile east of mouth of Puncheoncamp Branch; **Fire Creek Coal**; elevation, 1495' B.

		Ft.	In.
Shale, gray, silicious.....		8	0
Slate, coaly.....	0' 8"		
Coal, medium soft, columnar....	2 3		
Shale, dark, flaggy.....	3 0		
Coal.....	0 5	6	4
Shale, dark, to bed of creek.....		25	0

In the eastern edge of Browns Creek District, the three following exposures on the waters of Laurel Branch, were examined by Gawthrop:

Coal Opening—No. 728 on Map II.

In run, on west side of Laurel Branch, 1.5 miles northward from Kimball; **Fire Creek Coal**; elevation, 1700' B.

	Ft.	In.
Sandstone, massive, visible.....	5	0
Coal, soft, columnar (to slate floor and concealed)	2	6

Coal Opening—No. 729 on Map II.

On west bank of Laurel Branch, 0.5 mile northeast of Opening No. 728 above; **Fire Creek Coal**; elevation, 1720' B.

	Ft.	In.
Sandstone, massive, gray, visible.....	10	0
Coal, soft, columnar.....	2	7
Slate and concealed, mostly sandstone, to run...	50	0

Coal Opening—No. 79 on Map II.

Near school house on Laurel Branch, 1 mile northeast of Opening No. 728 above; **Fire Creek Coal**; elevation, 1765' B.

	Ft.	In.
Sandstone, massive.....	10	0
Coal, soft, columnar.....0' 11"		
Coal, harder.....0 2		
Coal, soft, columnar.....1 6	2	7
Shale and concealed to run.....	5	0

Gawthrop collected a sample for analysis at the above opening, the composition of which is published under **No. 79** in the first table of coal analyses at the end of this Chapter.

Big Creek District, McDowell County.

In Big Creek District, the Fire Creek Coal appears to attain minable dimensions and regularity. Its thickness and stratigraphic position are exhibited in the sections published in Chapter IV for Coalwood, Jacob Fork and Bearwallow Knob, pages 108, 112 and 119, respectively, and in the logs of Coal Test Borings Nos. 65-67, 69-74, 76-79, 81-86, 88, 91, 96, 98, 101, 106 and 107. These show it quite irregular in thickness and lead to the conclusion that even in the region outlined on Figure 26, there are several patches where it has thinned below merchantable dimensions. In the central portion of the District, the two following exposures were examined by the writer:

Coal Exposure—No. 730 on Map II.

In railroad cut, at Excelsior, 0.2 mile northwest of mouth of War Creek; **Fire Creek Coal**; elevation, 1355' B.

		Ft.	In.
Shale, fossil plants abundant, visible.....		5	0
Coal, Beckley ("War Creek")		5	0
Sandstone, massive, Quinnimont		45	0
Shale and concealed.....		3	0
Coal, soft	1' 6"		
Coal, slaty	1 0		
Shale, dark, plant fossils abundant.....	3 3		
Coal, soft	0 7		
Slate, coaly.....	0 4		
Coal, soft	0 10		
Slate, black, coaly.....	0 11		
Coal, soft	0 7	Fire Creek.	9 0
Shale, dark, sandy, to railroad grade.....		20	0

Coal Opening—No. 731 on Map II.

On north hillside of Dry Fork, 0.3 mile northeast of War, 2.6 miles northwest of Berwind; **Fire Creek Coal**; elevation, 1425' B.

		Ft.	In.
Coal, Beckley ("War Creek"), at Mine 77 on Map II		3	10
Shale, concealed, and sandstone.....		79	0
Coal	0' 3"		
Shale.....	0 8		
Coal, soft	1 9		
Coal, slaty	0 3		
Slate, gray, with coal streaks...1	9		
Coal, slaty	1 8	Fire Creek.	6 4
Slate and concealed.....		55	0
Sandstone, massive, Pineville		50	0
Coal, soft	3' 0"		
Slate.....	1 0		
Coal, soft (to slate floor)	2 0		
		No. 9 Pocahontas at Exposure No. 753 on Map II..	
		6	0

In the eastern portion of Big Creek District, the two following diggings were examined by Gawthrop:

Coal Prospect—No. 732 on Map II.

On point immediately east of mouth of Mountain Fork of Big Creek; **Fire Creek Coal**; elevation, 1760' B.

	Ft.	In.
Concealed.....		
Coal, thickness concealed, reported, Fire Creek ...	2	6
Concealed, sandstone, and concealed.....	40	0
Coal, Little Fire Creek (floor concealed)	0	8

Coal Opening—No. 733 on Map II.

On northwest hillside of Horsepen Creek, 0.5 mile northeast of mouth of latter; **Fire Creek Coal**; elevation, 2120' B.

			Ft.	In.
Sandstone, massive, gray, medium soft, visible...			4	0
Coal, medium soft.....1'	6 "			
Shale	0	0½		
Coal, soft.....0	4			
Slate	0	0½		
Coal, soft.....0	5		2	4
<hr/>				
Shale and concealed.....				

Adkin District, McDowell County.

In Adkin, the Fire Creek Coal is confined to several scattered patches near the mountain summits in the northwest half of the District, and for this reason it has not been prospected by natives for domestic fuel. Of the 41 coal test borings sunk in this area, only three—Nos. 137, 146 and 164 on Map II—appear to have started high enough in the measures to penetrate this bed, and these report a fair thickness of the seam as exhibited in their logs on preceding pages of this Chapter. The coal maintains its reputation for irregularity of thickness, but the areas designated on Figure 26 for this region should furnish quite a large tonnage from this seam when the thicker and better Nos. 4 and 3 Pocahontas beds approach exhaustion in the locality.

North Fork and Elkhorn Districts, McDowell County.

In North Fork and Elkhorn Districts, no exposures of the Fire Creek Coal were observed, but it is believed to be present in minable thickness and regularity in the areas designated on Figure 26.

Quantity of Fire Creek Coal Available.

Based on the foregoing data and a determination by Gawthrop of the area of the bed as outlined on Figure 26 by interpolation between that of the Beckley seam and the base of the

New River Group, the outcrops of which are indicated on Map II, the following estimate is made for the amount of Fire Creek Coal:

Probable Amount of Fire Creek Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Slab Fork.....	2.5	64.00	40,960	4,460,544,000	178,421,760
Center	2.5	16.00	10,240	1,115,136,000	44,605,440
Barkers Ridge..	3	35.00	22,400	2,927,232,000	117,089,280
Totals		115.00	73,600	8,502,912,000	340,116,480
McDowell:					
Sandy River....	2	45.00	28,800	2,509,056,000	100,362,240
Browns Creek..	2	60.00	38,400	3,345,408,000	133,816,320
Big Creek.....	2	100.00	64,000	5,575,680,000	223,027,200
Adkin	2	20.00	12,800	1,115,136,000	44,605,440
North Fork....	2	8.00	5,120	446,054,400	17,842,176
Elkhorn	2	2.00	1,280	111,513,600	4,460,544
Totals		235.00	150,400	13,102,848,000	524,113,920
Totals for Both Counties..		350.00	224,000	21,605,760,000	864,230,400

NO. 9 POCAHONTAS COAL.

The No. 9 Pocahontas Coal, described in Chapter VI, pages 212-13, is only of secondary importance. The regions in which it is known or believed to attain minable dimensions and regularity are indicated on Figure 6, page 378, along with that for the Stockton bed. As it belongs only 30 to 60 feet above the top of the Pocahontas Group, its outcrop should follow closely the same region as that outlined on Map II for the division line between the New River and Pocahontas Groups. It has never been mined commercially in the State, but it has been prospected by large land holding companies and opened at country banks by natives for domestic fuel in each county. Its thickness and character at these diggings will now be described by magisterial districts.

Slab Fork District, Wyoming County.

In Slab Fork, the No. 9 Pocahontas Coal, as a minable bed, appears to be confined to the southeastern portion of the District. Its thickness and stratigraphic position are exhibited in the Maben, Maben-Southwest and Left Fork of Allen Creek Sections, published in Chapter IV, pages 69, 70 and 72, respectively, and in the logs of Coal Test Borings Nos. 3, 7, 9, 10, 11 and 12 on Map II. These constitute the authority for the minable area of the seam as limited in this region on Figure 6. The following exposure was examined by Gawthrop:

Coal Exposure—No. 734 on Map II.

In bed of Farley Branch of Cabin Creek, 1.5 miles north of Joe Branch P. O.; No. 9 Pocahontas Coal; elevation, 1565' B.

	Ft.	In.
Sandstone, massive, Pineville, visible.....	10	0
Coal, medium soft, columnar...4'	0"	
Slate, flaggy and hard.....1'	3	
Coal	0	1
Slate, black and hard.....0	9	
Coal	2	0
	8	1

The three following exposures along Slab Fork in this District were examined by the writer:

Coal Exposure—No. 735 on Map II.

In Virginian Railway cut, 150 yards south of station at Maben; No. 9 Pocahontas Coal; elevation, 1594' L.

	Ft.	In.
Coal, soft, Fire Creek, at Opening No. 78 on Map II	3	0
Slate and concealed.....		
Shale, sandy.....	5	0
Sandstone	0	10
Shale	0	10
Coal, soft, columnar, No. 9 Pocahontas.....	2	10
Fire clay shale.....	2	0
Sandstone to railway grade.....	3	0

The same bed had been opened at Coal Prospect No. 736 on Map II, on the east bank of Slab Fork, slightly less than $\frac{1}{4}$ mile south of Maben, at an elevation of 1620' B. The digging was closed so that the thickness could not be obtained.

Coal Opening—No. 80 on Map II.

In run on east side of Slab Fork, $\frac{1}{4}$ mile northeast of Pierpont;
No. 9 Pocahontas Coal; elevation, 1660' B.

		Ft.	In.
1. Shale, dark, with plant fossils, visible.....		3	0
2. Coal, bony.....0' 2"			
3. Coal, soft, columnar (slate floor)	2 10	3	0

The writer collected a sample for analysis from No. 3 only of the above section, the composition of which is published under No. 80 in the first table of coal analyses at the end of this Chapter.

In the eastern edge of Slab Fork District, the writer examined the two following exposures.

Coal Opening—No. 737 on Map II.

On west hillside of Left Fork of Allen Creek, 2.1 miles due east of Maben; No. 9 Pocahontas Coal; elevation, 1885' B.

	Ft.	In.
Slate, black, visible.....	15	0
Coal, soft, columnar (to slate floor).....	4	5

Coal Opening—No. 738 on Map II.

On point, east hillside of Right Fork of Cedar, 1 mile southwest of Opening No. 737 last described; No. 9 Pocahontas Coal; elevation, 1810' B.

	Ft.	In.
Black slate with fossil plants, visible.....	25	0
Coal, bony.....0' 5"		
Coal, soft.....1 0	1	5

Bone and concealed by water.....

Center District, Wyoming County.

In Center, the No. 9 Pocahontas Coal, in minable thickness, is apparently confined to a small area in the eastern edge of the District, as shown on Figure 6, page 378. Its thickness and stratigraphic position are shown in the Pineville-Sugar Run Section, page 75, and in the logs of Coal Test Borings Nos. 17A, 20 and 21 on Map II, on Indian Creek. In this District the coal attains the maximum thickness—11 feet, without

parting—observed for it in the territory of this Report. It has been prospected and opened at country banks by natives for domestic fuel. The following opening was examined by Gawthrop:

Coal Opening—No. 739 on Map II.

On east hillside, 0.16 mile up Belcher Branch, 2.9 miles southeast of Pineville; **No. 9 Pocahontas Coal**; elevation, 1440' B.

		Ft.	In.
Sandstone, visible.....		5	0
Slate, coaly, 2" to.....		0	6
Coal, medium soft, columnar...1'	6"		
Coal, blocky.....	0	6	
Bone	0	3	
Coal, medium soft, columnar...0	10	3	1
Shale and concealed.....			

The five following diggings in Center District along the public road between Pineville and Mullens were examined by the writer:

Coal Opening No. 740 on Map II, on north edge of road, just northeast of mouth of Sugar Run, at an elevation of 1335' B., was closed, but here the No. 9 Pocahontas Coal is reported 4 to 5 feet thick.

Coal Prospect—No. 741 on Map II.

Edge of road near school house, 0.7 mile due east of mouth of Sugar Run; **No. 9 Pocahontas Coal**; elevation, 1365' B.

		Ft.	In.
Shale, dark gray, plant fossil stems abundant, visible.....		3	0
Coal, soft.....0'	1½"		
Shale, black.....	1	3	
Coal, soft (to slate floor).....3	1	4	5½

Coal Prospect—No. 742 on Map II.

Edge of road, north bank of Guyandot, 2.4 miles east of Pineville and 0.5 mile east of mouth of Sugar Run; **No. 9 Pocahontas Coal**; elevation, 1390' B.

		Ft.	In.
Sandstone, platy and massive, grayish white, Pineville, visible.....		25	0
Shale, sandy, with thin sandstones.....		12	0
Slate, gray, with coal streaks..1'	5"		
Coal, soft.....	0	7	0
Slate and sandstone.....		10	0

Coal Prospect—No. 743 on Map II.

Edge of road, only 150 feet east of Prospect No. 742 above; **No. 9 Pocahontas Coal**; elevation, 1380' B.

	Ft.	In.
Concealed and shale.....		
Coal , soft, columnar, no partings (slate floor)....	11	1

Coal Prospect—No. 744 on Map II.

Edge of road, only 100 feet east of Prospect No. 743 above; **No. 9 Pocahontas Coal**; elevation, 1375' B.

	Ft.	In.
Concealed by debris.....		
Coal , slaty.....0' 2½"		
Coal , soft, columnar (slate floor) .....6 5	6	7½

The composition of a sample collected by M. A. Miller from the above prospect, as published under No. 60W on page 230 of Bulletin 2 of the State Geological Survey Reports, is as follows:

	Per cent.
Moisture.....	0.54
Volatile Matter.....	19.66
Fixed Carbon.....	76.00
Ash.....	3.80
Total	100.00
Sulphur.....	0.280
Phosphorus.....	0.002

The above results, determined by H. Froehling, show a coal of exceptional purity.

The four foregoing openings illustrate the striking irregularity of this coal seam, a feature that accompanies it throughout both Counties. The stratigraphic position of the coal at these diggings is shown in the Pineville-Sugar Run Section, page 75.

Barkers Ridge District, Wyoming County.

In Barkers Ridge, the No. 9 Pocahontas Coal appears to be present over a considerable portion of the District, as shown on Figure 6, page 378. Its stratigraphic position is exhibited in the Bailey Chapel and Clarks Gap Sections published in Chapter IV, pages 83 and 84, respectively. The two fol-



PLATE XXVIII(a)—Showing a portion of Gary, McDowell County, and topography of the Pocahontas Group.—Photo furnished by H. N. Eavenson of Gary.



PLATE XXVIII(b)—Showing type of homes built for miners at Filbert, McDowell County, by the U. S. Coal & Coke Co., and topography of the Pocahontas Group.—Photo furnished by H. N. Eavenson.

lowing openings, examined by the writer in the western point of the District, are the only exposures observed in Barkers Ridge:

Coal Opening—No. 745 on Map II.

On point, bend of road, north bank of Pinnacle Creek, $2\frac{1}{4}$ miles southeast of Pineville; **No. 9 Pocahontas Coal**; elevation, 1375' B.

			Ft.	In.
Sandstone, broken, Pineville				
Coal, soft.....	0'	10"		
Slate, with coal streaks.....	1	4		
Coal, soft.....	1	9		
Coal and black slate, interlam- inated, mostly slate.....	2	7		
Coal, soft (slate floor).....	0	8	7	2

Coal Opening—No. 747 on Map II.

On south bank of Guyandot River, 2.6 miles southeast of Pineville, and 0.6 mile south of Prospect No. 743; **No. 9 Pocahontas Coal**; elevation, 1375' B.

			Ft.	In.
Sandstone, making great cliff, Pineville , visible..			40	0
Coal, with sandstone layers..	1'	2"		
Slate, sandy and hard.....	5	0		
Coal, soft, columnar.....	1	2		
Slate, black, with coal streaks..	2	10		
Coal, soft, columnar (slate floor).....	4	3	14	5

The two foregoing diggings belong slightly less than 300 feet above the No. 3 Pocahontas Coal and about 450 feet below the Sewell seam.

Sandy River District, McDowell County.

In Sandy River, the No. 9 Pocahontas Coal lies below drainage in every portion of the District; hence, the only source of information as to its thickness and character is the logs of Coal Test Borings Nos. 38 and 39, published in connection with the Avondale and Bradshaw Sections, pages 93-6 and 96-9, respectively. These in a large measure account for the barren area shown for this District on Figure 6, page 378, along with the normal northwest thinning of the beds which always has to be considered.

Browns Creek District, McDowell County.

In Browns Creek District, the No. 9 Pocahontas Coal first rises above drainage southeastward along Tug Fork 2 to 3 miles below Welch, but, as shown by the sections below, it does not appear to attain minable dimensions and purity. This conclusion is further corroborated by the logs of Coal Test Borings Nos. 47, 54, 58 and 60 on Map II, the details of which are published on preceding pages of this Chapter. The four following exposures along Tug were examined by the writer:

Coal Exposure—No. 748 on Map II.

In N. & W. Ry. cut, 0.2 mile west of mouth of Shannon Branch, and 2 miles northwest of Welch; **No. 9 Pocahontas Coal**; elevation, 1270' B.

	Ft.	In.
Sandstone, massive, grayish white and hard, Pineville	40	0
Coal	1	2
Fire clay shale to railroad grade.....	1	0

Coal Digging No. 749 on Map II, in the same bed at edge of road on point immediately southeast of mouth of Upper Shannon Branch, at an elevation of 1285' B., was closed, but, judging from the accompanying debris, not much coal was found.

The No. 9 Pocahontas bed is only 12 to 15 inches in thickness at **Coal Exposure No. 750 on Map II**, at the east portal of the Hemphill Tunnel, at an elevation of 1315' B.

Coal Exposure—No. 751 on Map II.

At east portal of Welch Tunnel; **No. 9 Pocahontas Coal**; elevation, 1360' B.

	Ft.	In.
Shale, and black slate, visible.....	3	0
Sandstone, medium grained, gray and brown, Pineville	47	0
Coal , 0" to.....0' 2"		
Sandstone.....1 0		
Coal.....0 10	2	0
Fire clay shale.....	1	0
Sandstone, platy, bluish gray, fine grained, to railroad grade.....	55	0

The following exposure was examined by Gawthrop:

Coal Exposure—No. 752 on Map II.

In railroad cut on Laurel Branch of Tug Fork, $1\frac{1}{4}$ miles north of Kimball; **No. 9 Pocahontas Coal**; elevation, 1650' B.

			Ft.	In.
Sandstone, shaly, visible.....			10	0
Coal.....	0'	8"		
Slate.....	0	2	No. 9 Pocahontas	
Coal.....	0	9		1	7
<hr/>				
Shale, gray, silicious.....			30	0
Coal, No. 8 Pocahontas (to shale floor).....			0	10

Big Creek District, McDowell County.

In Big Creek District, the apparent minable area of the No. 9 Pocahontas Coal is confined to 1000 to 1500 acres on Dry Fork, just above the mouth of War Creek, as revealed by exposures along the N. & W. Ry. grade between Yukon and Berwind, and, even here, it is very irregular in thickness, as shown by the sections below. Its thickness and stratigraphic position at widely scattered points are exhibited in the Coalwood, Jacob Fork and Bearwallow Knob Sections, published in Chapter IV, pages 108, 112 and 119, respectively, and in the logs of Coal Test Borings Nos. 66, 69, 74, 76, 77, 79, 81, 82, 83, 85, 86, 88, 90, 91, 96, 98, 105 and 123 on Map II. These corroborate the barren areas of this bed as shown on Figure 6, page 378, for the Big Creek District region.

The two following exposures along Dry Fork were examined by the writer:

Coal Exposure—No. 753 on Map II.

North bank of Dry Fork, $\frac{1}{4}$ mile west of mouth of Johns Branch, and 2.5 miles northwest of Berwind; **No. 9 Pocahontas Coal**; elevation, 1315' B., 15 feet below the N. & W. Ry. grade.

			Ft.	In.
Sandstone, Pineville.....			50	0
Coal, soft.....	3'	0"		
Slate.....	1	0		
Coal, soft, (to slate floor).....	2	0	6	0

About 200 yards southwestward, this coal emerges above railway grade on a strictly local reversal of the general northwest dip of the rocks, at an angle of 15 to 20 degrees with the horizontal, where the following section was measured:

			Ft.	In.
Coal, soft.....	3'	7"		
Slate, gray.....	0	7	No. 9	
Coal, soft.....	1	7	Pocahontas	5 9

Each bench has a slightly less thickness, as also the parting slate, where the seam is exposed along the same railway grade, 150 yards eastward from Coal Exposure No. 753 on Map II, above described, as shown by the following section:

			Ft.	In.
Sandstone, making great cliff, Pineville.....			50	0
Coal, soft.....	2'	10"		
Slate, gray.....	0	10	No. 9	
Coal, soft (1350' B.).....	1	3	Pocahontas	4 11
Shale, buff and dark.....			12	0
Coal, soft.....			0	7
Sandstone, massive, to railroad grade.....			6	0

Southeastward along the same railway grade on Dry Fork, the six following exposures were examined by Gawthrop:

Coal Exposure—No. 746 on Map II.

On northeast bank of Dry Fork, N. & W. Ry. cut, 2.4 miles northward from Berwind; No. 9 Pocahontas Coal; elevation, 1400' B.

			Ft.	In.
Shale, visible.....			5	0
Coal, soft.....	0'	2"		
Shale.....	0	2		
Coal.....	0	7		
Slate and coal.....	0	2	No. 9	
Coal.....	0	2	Pocahontas	1 3
Shale, gray, silicious.....			8	0
Shale, dark, flaggy, plant fossils abundant.....			2	0
Coal (to shale floor).....			0	6

Coal Exposure—No. 754 on Map II.

On east bank of Dry Fork, N. & W. Ry. cut, 0.6 mile south of Johns Branch, and 2 miles north of Berwind; **No. 9 Pocahontas Coal**; elevation, 1425' B.

			Ft.	In.
Sandstone, shaly, visible.....			10	0
Sandstone, massive.....			15	0
Coal, soft.....	0'	11"		
Bone	0	2	No. 9	
Coal, soft.....	0	8	Pocahontas	
			1	9
<hr/>				
Sandstone, shaly.....			10	0
Sandstone, massive, and concealed.....			25	0
Coal, soft, No. 8 Pocahontas (shale floor).....			0	6

Coal Exposure—No. 754A on Map II.

In N. & W. Ry. cut, east bank of Dry Fork, 0.4 mile southwest of Exposure No. 754 above; **No. 9 Pocahontas Coal**; elevation, 1435' B.

			Ft.	In.
Sandstone, shaly, visible.....			5	0
Coal, soft.....	0'	9"		
Bone coal.....	0	4		
Coal, soft.....	0	5		
Shale, hard.....	0	6		
Coal, bony.....	0	2	2	2
Shale, flaggy.....			2	0
Sandstone, massive, to railroad grade.....			15	0

Coal Exposure—No. 755 on Map II.

In N. & W. Ry. cut, 0.5 mile northwest of Big Creek; **No. 9 Pocahontas Coal**; elevation, 1440' B.

			Ft.	In.
Sandstone, massive, gray and hard, Pineville			30	0
Coal, soft.....	0'	11"		
Bone coal, 1" to.....	0	6		
Coal, soft.....	0	11	2	4
Slate to railroad grade.....			1	0

Coal Exposure—No. 756 on Map II.

In N. & W. Ry. cut, north bank of Dry Fork, 0.2 mile northwest of Rift; **No. 9 Pocahontas Coal**; elevation, 1475' B.

			Ft.	In.
Sandstone, shaly, visible.....			15	0
Coal, soft.....	0'	11"		
Shale with coal streaks.....	0	4	No. 9	
Coal.....	0	3	Pocahontas	
			1	6

	Ft.	In.
Fire clay shale.....	1	0
Sandstone, massive.....	24	0
Coal, soft.....	0	6
Fire clay shale to railroad grade.....	5	0

Coal Exposure—No. 757 on Map II.

In N. & W. Ry. cut, 0.2 mile northeast of Exposure No. 756 above;
No. 9 Pocahontas Coal; elevation, 1480' B.

		Ft.	In.
Sandstone, shaly, visible.....		15	0
Coal, slaty.....	1' 2"		
Slate.....	0 1		
Coal.....	0 4		
Slate, coaly.....	0 4		
Slate.....	0 1	No. 9	
Coal.....	0 3	Pocahontas	2 3
<hr/>			
Sandstone, shaly.....		5	0
Coal.....		0	3
Fire clay and sandstone, shaly.....		15	0
Shale, dark, laminated.....		15	0
Coal, soft.....	0' 3"		
Slate, coaly.....	0 1	No. 8	
Coal, soft.....	0 4	Pocahontas	0 8

Fire clay shale.....

The 6 foregoing exposures of the No. 9 Pocahontas Coal along Dry Fork illustrate in a marked manner its irregular bed section, and corroborate the barren region for this seam as indicated on Figure 6 between the mouth of Johns Branch and Berwind.

On the waters of Horsepen Creek in the extreme eastern edge of Big Creek District, the 5 following exposures were examined by Gawthrop:

Coal Opening—No. 758 on Map II.

In drain, west side of Rockhouse Branch, 0.6 mile northwest of Horsepen P. O.; No. 9 Pocahontas Coal; elevation, 2200' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Coal, soft, columnar.....	0' 11"		
Slate with coal streaks.....	0 7		
Coal, soft.....	0 2		
Slate, gray.....	0 7		
Coal, soft, columnar (shale floor).....	0 9	3	0

The above digging belongs 360 to 375 feet above the No. 3 Pocahontas Coal, or about the interval expected in this region for the No. 9 seam.

Coal Opening—No. 759 on Map II.

On east bank of Rockhouse Branch, 0.5 mile northeast of Opening No. 758; No. 9 Pocahontas Coal; elevation, 2250' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Coal, soft, columnar.....1'	0"		
Shale, with coal streaks.....0	6		
Coal, soft.....0	3		
Shale, with coal streaks.....0	6		
Coal, soft, columnar.....1	3½		
Fire clay shale.....0	0½		
Coal (to shale floor).....0	2	3	9

Coal Opening—No. 760 on Map II.

In edge of Virginia, south hillside of Horsepen Creek, 0.4 mile east of Horsepen; No. 9 Pocahontas Coal; elevation, 2125' B.

		Ft.	In.
Shale roof.....			
Coal, soft, columnar.....1'	0"		
Shale, with coal streaks.....0	5		
Coal, soft, columnar.....0	6		
Shale, black, soft.....0	2		
Coal, soft, columnar.....0	11		
Shale, gray, 0" to.....0	4		
Coal, soft, columnar (shale floor).....0	2	3	6

Coal Opening—No. 761 on Map II.

On west hillside, 0.5 mile up Low Gap Branch of Horsepen Creek; No. 9 Pocahontas Coal; elevation, 2270' B.

		Ft.	In.
Shale, bluish gray, visible.....		8	0
Coal, soft, columnar.....0'	11 "		
Shale, dark gray.....0	2		
Coal, soft, columnar.....0	4		
Shale, with coal streaks.....0	4		
Coal, soft, columnar.....1	0		
Shale.....0	0½		
Coal, soft (shale floor).....0	2½	3	0

Coal Opening—No. 762 on Map II.

On head of Low Gap Branch of Horsepen Creek; 2.7 miles east of Squirejim; **No. 9 Pocahontas Coal**; elevation, 2490' B.

		Ft.	In.
Sandstone, massive, grayish white, fine grained, visible.....		5	0
Shale, gray.....		2	0
Coal, soft, columnar.....	0' 10 "		
Shale, dark.....	0 1½		
Coal, soft, columnar.....	0 3½		
Shale, with coal streaks.....	0 4		
Coal, soft, columnar.....	1 3	2	10

Fire clay shale and concealed.....

From the 5 foregoing sections it is quite evident that this bed carries too much shaly material in this portion of Big Creek District to be classed as minable.

Adkin District, McDowell County.

In Adkin, the No. 9 Pocahontas Coal does not appear to attain minable dimensions and purity as is partly evidenced by the logs of Coal Test Borings Nos. 136, 137, 163, 164 and 168 on Map II, and further corroborated by the following opening along the western edge of the District:

Coal Opening—No. 763 on Map II.

In Mill Creek, 2¼ miles west of Gary; **No. 9 Pocahontas Coal**; elevation, 1575' B.

		Ft.	In.
Sandstone, shaly.....		0	6
Limestone, silicious, nodular.....		0	6
Shale, silicious.....		10	0
Coal, soft.....	1' 4"		
Slate.....	0 3		
Coal (shale floor and concealed.....)	0 7	2	2

The above digging belongs about 390 feet above the No. 3 Pocahontas Coal, as shown by the structure contours on Map II. No other exposures of this seam were observed in Adkin District.

North Fork and Elkhorn Districts, McDowell County.

In North Fork and Elkhorn Districts, the No. 9 Pocahontas Coal crops high up on the mountain slopes, and is believed to attain minable dimensions in the locality designated on Figure 6, page 378. No exposures were observed on it in these areas, but on the head of Crane Creek in the edge of Mercer County, Thos. H. Clagett, Chief Engineer for the Pocahontas Coal and Coke Co., reports it 3 feet in thickness over a considerable acreage, 400 feet above the No. 3 Pocahontas bed.

Quantity of No. 9 Pocahontas Coal Available.

Based on the foregoing evidence and a determination of the area as indicated on Figure 6, page 378, the following estimate is made for the amount of No. 9 Pocahontas Coal available in both Counties:

Probable Amount of No. 9 Pocahontas Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Slab Fork.....	2.5	20.0	12,800	1,393,920,000	55,756,800
Barkers Ridge...	2.5	35.0	22,400	2,439,360,000	97,574,400
Totals.....	.....	55.0	35,200	3,833,280,000	153,331,200
McDowell:					
Big Creek.....	2.5	2.0	1,280	139,392,000	5,575,680
North Fork.....	2.5	4.5	2,880	313,632,000	12,545,280
Elkhorn.....	2.5	1.5	960	104,544,000	4,181,760
Totals.....	.....	8.0	5,120	557,568,000	22,302,720
Totals for Both Counties.		63.0	40,320	4,390,848,000	175,633,920

MINABLE COALS OF THE POCAHONTAS GROUP.

In Wyoming and McDowell Counties, there are 5 minable coals in the Pocahontas Group; viz, No. 7 Pocahontas, No. 6 Pocahontas, No. 5 Pocahontas, No. 4 Pocahontas, and No. 3 Pocahontas, in descending order.

NO. 7 POCAHONTAS COAL.

The No. 7 Pocahontas Coal, described in Chapter VII, pages 217-18, is of secondary importance. The regions in which it is known or believed to attain minable dimensions and purity are indicated on Figure 7, page 380, along with that for the Coalburg bed. As it belongs only 50 to 75 feet below the top of the Pocahontas rocks, its outcrop should follow closely, the same region as that outlined on Map II for the division line between the New River and Pocahontas Groups. It has never been mined commercially in the State, but it has been prospected to a considerable extent by natives for domestic fuel. Its character at these diggings and crop exposures will now be described by magisterial districts.

Slab Fork District, Wyoming County.

In Slab Fork, the No. 7 Pocahontas Coal, in minable dimensions and purity, is apparently confined to the southeast portion of the District. Its thickness and stratigraphic position are exhibited in the Maben, Maben-Southwest and Left Fork of Allen Creek Sections, in Chapter IV, pages 70, 71 and 73, respectively, and in the logs of Coal Test Borings Nos. 3, 7, 10 and 13 on Map II, the details of which are published on preceding pages of this Chapter. These corroborate the barren area indicated for this bed on Figure 7, mentioned above, in the northwest portion of the District. The two following exposures on Slab Fork along the Virginian Railway were examined by the writer:

Coal Exposure—No. 765 on Map II.

In railroad cut, south edge of Pierpont; **No. 7 Pocahontas Coal**; elevation, 1600' B.

	Ft.	In.
Shale, sandy, visible.....	20	0
Shale, dark, fossil plants, calamites.....	3	0
Coal, soft.....	2	2
Fire clay shale, dark.....	5	0
Sandstone, massive, micaceous, hard, bluish gray, Pierpont, to railroad grade.....	15	0

The above exposure belongs 50 to 60 feet below the No. 9 Pocahontas bed at Opening No. 80 on Map II, and 210 feet above the No. 3 Pocahontas seam.

Coal Exposure—No. 766 on Map II.

In railroad cut, $\frac{1}{4}$ mile southeast of Exposure No. 765; **No. 7 Pocahontas Coal**; elevation, 1630' B.

	Ft.	In.
Shale, sandy, visible.....	12	0
Coal, soft, columnar.....	2'	3"
Bone.....	0	4
Coal, medium soft.....	0	6
Fire clay shale, dark.....	2	0
Sandstone, Pierpont, massive, making great cliff, to railroad grade.....	55	0

The above exposure is the type locality of the **Pierpont Sandstone**, mentioned in Chapter VII. under the description of this stratum. The following exposure in the east edge of the District was examined by the writer:

Coal Opening—No. 767 on Map II.

On east bank of Right Fork of Cedar Creek, 2 miles southeast of Maben; **No. 7 Pocahontas Coal**; elevation, 1740' B.

	Ft.	In.
Shale, dark, sandy, visible.....	13	0
Coal, soft, columnar.....	3	5
Slate	1	0
Sandstone, massive, Pierpont, forming steep bluff.		

The three foregoing exposures indicate that there is a valuable deposit of the No. 7 Pocahontas bed in Slab Fork District in the areas designated by Figure 7.

Center District, Wyoming County.

In Center District, the No. 7 Pocahontas Coal lies entirely below drainage, except in a narrow strip along the west hillsides of Pinnacle and Little Whiteoak Creeks, where no exposures were observed. The logs of Coal Test Borings Nos. 17A and 20 on Map II, on preceding pages of this Chapter, and No. 15, published in connection with the Pineville-Sugar Run Section, pages 74-6, corroborate the barren area indicated on Figure 7 in this District for the No. 7 Pocahontas seam.

Barkers Ridge District, Wyoming County.

In Barkers Ridge, the No. 7 Pocahontas Coal, in minable dimensions and purity, appears to be confined to a small area in the southern corner of the District, as indicated on Figure 7. Its thickness and stratigraphic position are exhibited in the general sections published in Chapter IV for Mullens, Hern-don and Clarks Gap. Its thickness and bed section at **Coal Exposure No. 769 on Map II** are shown in the Bailey Chapel Section, in Chapter IV, page 83. No other exposures of this seam were definitely recognized in the District.

Sandy River District, McDowell County.

In Sandy River District, the No. 7 Pocahontas Coal lies entirely below drainage, the only source of information as to its thickness and character being the logs of Coal Test Borings Nos. 38 and 39 on Map II, the details of which are published in Chapter IV in connection with the Avondale and Bradshaw Sections, pages 93-6 and 96-9, respectively. These corroborate the barren area for this bed shown on Figure 7 for the seam over the whole of the District, when the general north-west thinning of the measures is also considered.

Browns Creek District, McDowell County.

In Big Creek District, the No. 7 Pocahontas Coal does not appear to attain minable dimensions and purity as shown by the Cub Branch-Pando and Welch Sections, in Chapter IV,

pages 104 and 106, respectively, and by the logs of Coal Test Borings Nos. 54, 58, 59, 60 and 63 on Map II, the details of which are published on preceding pages of this Chapter. It was observed at only one point; viz, **Coal Exposure No. 770 on Map II**, in the hill road, 0.6 mile north of Big Four, at an elevation of 1620' B., as determined by Gawthrop. Its thickness was not determined, but it belongs about 300 feet above the No. 3 Pocahontas bed.

Big Creek District, McDowell County.

In Big Creek District, the No. 7 Pocahontas Coal does not appear to attain merchantable thickness and regularity, as attested by the logs of Coal Test Borings Nos. 65, 66, 72-74, 77, 80, 85, 86, 88, 90, 91, 98, 99, 101, 104, 107, 108, 110, 111, 113, 121, 122 and 124 on Map II, the details of which are given on preceding pages of this Chapter, and in Nos. 97 and 114, in Chapter IV, published in connection with the Bearwallow Knob and Berwind Sections, pages 119-21 and 116-77, respectively. The three following exposures of this seam were examined by Gawthrop:

Coal Exposure—No. 771 on Map II.

In railroad cut at Berwind Station; **No. 7 Pocahontas Coal**; elevation, 1550' B.

				Ft.	In.
Sandstone, massive.....				30	0
Concealed.....				60	0
Shale, brownish gray.....				5	0
Coal, soft.....	0'	6"			
Shale, 0" to.....	0	1			
Coal.....	0	1			
Shale, dark.....	0	2	No. 7		
Coal.....	0	6	Pocahontas	1	4
<hr/>					
Fire clay shale.....				5	0
Sandstone, massive, hard, gray, fine grained, mica- ceous, quarried to some extent, Pierpont				15	0
Concealed.....				10	0
Sandstone, massive, brown, Pierpont				15	0
Shale, bluish gray.....				5	0
Coal, soft, columnar..	1'	3"	No. 6 Pocahontas Exposure No. 794..		
Shale, silicious.....	10	0			
Coal.....	0	2			
<hr/>					
Shale to railroad grade.....				8	0

At the above exposure, the No. 7 Pocahontas bed belongs 250 feet above the No. 3 Pocahontas seam.

Coal Exposure—No. 772 on Map II.

In drain, $\frac{1}{4}$ mile southwest of Long Branch of Big Creek, 4 miles northeast of Berwind; **No. 7 Pocahontas Coal**; elevation, 1670' B.

			Ft.	In.
Sandstone, massive, visible.....			5	0
Coal	0'	4 "		
Shale	0	1½		
Coal	0	5		
Shale	0	3		
Coal	0	6½	1	8
Shale and concealed.....			10	0
Sandstone, massive.....			15	0
Concealed, with sandstone.....			20	0
Concealed			5	0
Coal, No. 6 Pocahontas, at prospect, closed.....				

Coal Prospect—No. 773 on Map II.

Edge of hill road, head of Road Fork, 1.1 miles southeast of Squirejim; **No. 7 Pocahontas Coal**; elevation, 2095' B.

Coal (digging closed), only 6 inches visible.

Adkin District, McDowell County.

In Adkin District, practically the same conditions prevail in regard to the No. 7 Pocahontas Coal as in the area last described, in that it appears too thin and irregular to be classed as a minable seam, as attested by the logs of Coal Test Borings Nos. 137, 145, 146, 163-4, 166 and 168 on Map II, the details of which are published on preceding pages of this Chapter. The following, examined by Gawthrop, is the only exposure of the bed observed:

Coal Opening—No. 796 on Map II.

On ridge, 1.6 miles due east of Leckie; **No. 7 Pocahontas Coal**; elevation, 2650' B.

			Ft.	In.
Sandstone, shaly.....				
Shale, with coal streaks.....	1'	6"		
Shale, gray.....	1	3		
Coal, visible.....	0	8		
Coal, concealed by water, reported	0	6	3	11

This digging belongs 290 feet above the No. 3 Pocahontas bed.

North Fork District, McDowell County.

In North Fork District, the No. 7 Pocahontas Coal attains minable dimensions and purity as shown on Figure 7, page 380. The two following openings were examined by Gawthrop:

Coal Opening No. 774 on Map II, on the south bank of Buzzard Branch of Elkhorn Creek, 3.3 miles northeast of North Fork, at an elevation of 2225' B., is in the No. 7 Pocahontas bed, but the digging was closed so that the thickness could not be determined.

Coal Opening—No. 81 on Map II.

In road, $\frac{1}{4}$ mile north of Crumpler (Burkes Garden); **No. 7 Pocahontas Coal**; elevation, 2700' B.

			Ft.	In.
Shale, silicious.....				
Coal, medium soft, blocky....	1'	0 "		
Slate	0	0 $\frac{1}{2}$		
Coal, hard, gray.....	0	1 $\frac{1}{2}$		
Coal, soft.....	1	0		
Coal, medium soft.....	1	1	3	3
<hr/>				
Slate and concealed.....			2	0
Sandstone, massive, gray.....			15	0
Interval to No. 3 Pocahontas Coal			285	0

Gawthrop collected a sample for analysis at the above digging, omitting the slate parting, the composition of which is published under **No. 81** in the first table of coal analyses at the end of this Chapter. The results show an unusual high percentage of ash for coals of the Pocahontas Group, which is probably due to the weathered condition of the sample and the upper bench, the latter having a blocky character at this point.

Elkhorn District, McDowell County.

In Elkhorn, no exposures of the No. 7 Pocahontas Coal were observed, but it is believed to be present in minable dimensions and purity within the area designated on Figure 7.

Quantity of No. 7 Pocahontas Coal Available.

Based on the foregoing evidence and a determination by Gawthrop of the area designated on Figure 7, page 380, the following estimate is made for the amount of No. 7 Pocahontas Coal available in both Counties:

Probable Amount of No. 7 Pocahontas Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Slab Fork.....	2	15.0	9,600	836,352,000	33,454,080
Barkers Ridge...	2	6.0	3,840	334,540,800	13,381,632
Totals.....	.....	21.0	13,440	1,170,892,800	46,835,712
McDowell:					
North Fork.....	2.5	8.0	5,120	557,568,000	22,302,720
Elkhorn	2.5	3.0	1,920	209,088,000	8,363,520
Totals.....	.....	11.0	7,040	766,656,000	30,666,240
Totals for Both Counties..		32.0	20,480	1,937,548,800	77,501,952

THE NO. 6 POCAHONTAS COAL.

The No. 6 Pocahontas Coal, described in Chapter VII, page 220, is a valuable deposit of fuel, covering a large acreage in the eastern borders of Wyoming and McDowell, as shown approximately on Figure 8, page 381, along with that for the Winifrede bed. It has never been mined commercially in either County, but it has been in Mercer, a full description of its composition and character at an operation in the latter area being given on pages 224-8. inclusive, of Bulletin 2 of the W. Va. Geological Survey Reports. Therein it is shown to be exceptionally low in the impurities—ash, sulphur and phosphorus—and to possess coking qualities in a high degree. In the territory of this Report, the bed has been prospected quite extensively by the large land holding companies and by natives for domestic fuel. Its thickness and character at these borings and diggings will now be described by magisterial Districts.

Oceana District, Wyoming County.

In Oceana, the No. 6 Pocahontas Coal lies entirely below drainage, but it is not believed to attain minable dimensions and persistence, except in a small area on Laurel Fork in the eastern edge of the District. Here, the log of Coal Test Boring No. 1 on Map II, page 271, shows $4\frac{1}{2}$ feet of coal, 450 feet below the Sewell bed, that appears to correlate with the No. 6 Pocahontas seam. Owing to the uncertainty of correlation due to the rapid northwest thinning of the measures in this region, the minable area of the coal on Figure 8 was not extended westward into Oceana District.

Slab Fork District, Wyoming County.

In Slab Fork District, the No. 6 Pocahontas Coal is a very important bed, as shown on Figure 8, and in the logs of Coal Test Borings Nos. 3, 7, 8, 10, and 13 on Map II, and the general sections published in Chapter IV for Cabin Creek Ridge, Maben, Maben—Southwest and Left Fork of Allen Creek. Its thickness may be observed at a glance in the Table of Coal Test Borings for Wyoming County, page 268.

A sample of the core from this bed in Boring No. 3 on Map II, on Laurel Branch, 2.3 miles northwest of Saulsville, was analyzed, the composition of which, as reported by E. M. Merrill, of Beckley, W. Va., is as follows:

	Per cent.
Moisture	0.32
Volatile Matter.....	19.93
Fixed Carbon.....	76.69
Ash	3.06
Total.....	100.00
Sulphur	0.72

In the southeast edge of the District, the two following openings were examined by the writer:

Coal Opening—No. 775 on Map II.

On west hillside, 1.2 miles up Left Fork of Allen Creek; **No. 6 Pocahontas Coal**; elevation, 1715' B.

	Ft.	In.
Sandstone, massive, Pierpont , visible.....	12	0
Shale, dark blue, sandy, plant fossils.....	1	3
Coal, soft (to shale floor).....	1	7

Coal Opening—No. 776 on Map II.

On west hillside of Left Fork of Allen Creek; **No. 6 Pocahontas Coal**; elevation, 1715' B.

	Ft.	In.
Shale, dark, bluish gray.....	6	0
Coal, soft, columnar.....1' 1 "		
Shale, gray, 1/8" to.....0 0 1/4		
Coal, soft, columnar (to slate floor).....0 10	1	11 1/4

The two foregoing diggings belong about 120 feet above the No. 3 Pocahontas bed and 40 to 50 feet above the No. 4 Pocahontas seam, the horizon of the latter being shown in the Left Fork of Allen Creek Section, page 73.

Center District, Wyoming County.

In Center District, the No. 6 Pocahontas Coal does not appear to attain minable dimensions and regularity as is shown by the logs of Coal Test Borings Nos. 17A, 20 and 21 on Map II, published in the table of borings for Wyoming County and in detail on preceding pages of this Chapter, and in No. 15, used in connection with the Pineville—Sugar Run Section, page 76. The northeast border may hold a small area of this seam in merchantable thickness, but its acreage in this locality can only be determined by the drilling of additional tests, as it lies below drainage.

Barkers Ridge District, Wyoming County.

In Barkers Ridge District, the No. 6 Pocahontas Coal appears to be present in minable dimensions over quite a large acreage, as shown on Figure 8, page 381. Here, it has been

prospected quite extensively by the large land holding companies and by natives for domestic fuel. Its thickness and stratigraphic position at scattered points are shown in the general sections published in Chapter IV for Mouth of Whiteoak Branch, (at Openings Nos. 801 and 802 on Map II), Bailey Chapel and Clarks Gap, and in the log of Coal Test Boring No. 24 on Map II. In the north edge of the District, the following section of this bed at a prospect opening was furnished by M. L. Bailey, Engineer for the Pocahontas Coal & Coke Co.:

Coal Prospect—No. 777 on Map II.

On southwest hillside of Guyandot River, 0.4 mile south of Mul-lens; No. 6 Pocahontas Coal; elevation, 1655' B.

			Ft.	In.
Slate				
Coal	0'	4 "		
Fire clay.....	0	4		
Coal	0	10½		
Slate	0	5		
Coal (to slate floor).....	0	8	2	7½

Three miles southward in the same District, the 3 following exposures on Barkers Creek were examined by the writer:

Coal Opening—No. 778 on Map II.

On north bank of a west side run of Barkers Creek, at Bud; No. 6 Pocahontas Coal; elevation, 1610' B.

			Ft.	In.
Sandstone, visible.....			5	0
Coal, 1" to.....			0	6
Sandstone, 12" to.....			2	0
Shale, bluish gray, plant fossils.....			8	0
Sandstone, flaggy and dark.....			2	6
Coal, medium soft.....	2'	4½"		
Slate, gray.....	0	2½		
Coal, soft (to slate floor).....	0	5	3	0

The above opening belongs 150 feet above the horizon of the No. 3 Pocahontas Coal which is below the drainage at this point.

Coal Exposure—No. 779 on Map II.

In Virginian Railway cut, north side of Barkers Creek, 0.2 mile northeast of Opening No. 778; **No. 6 Pocahontas Coal**; elevation, 1603' L.

		Ft.	In.
Sandstone, Pierpont , making great cliff.....		60	0
Shale, dark, sandy, laminated.....		7	0
Coal, soft.....	2' 3" Upper Bench		
Coal, slaty.....	0 3 (1613' L.)		
Coal, soft.....	0 7	3	1
Shale, gray and sandy.....		8	0
Coal, soft.....	1' 2" Lower Bench		
Coal, slaty.....	0 5 (1603' L.)		
Coal, soft.....	0 5	2	0
Slate to railroad grade.....		5	0

Coal Exposure—No. 780 on Map II.

In Virginian Railway cut, 0.6 mile southeast of Bud and 0.4 mile northwest of mouth of Gooney Otter; **No. 6 Pocahontas Coal**; elevation, 1655' B.

		Ft.	In.
Sandstone, Pierpont , massive, visible.....		30	0
Shale, dark, 0" to.....		3	0
Coal, soft.....	2' 2"		
Slate, dark, coaly.....	0 2 Upper Bench		
Coal, soft (to shale floor)....	0 8	3	0

Fifty yards southeastward, this coal has been cut away entirely by the overlying Pierpont Sandstone, as shown in a railway cut. In the southeastern portion of Barkers Ridge District, the 10 following exposures were examined by Gawthrop:

Coal Opening—No. 781 on Map II.

Edge of road, 0.3 mile southwest of Basin and 3.5 miles northeast of Herndon; **No. 6 Pocahontas Coal**; elevation, 2440' B.

		Ft.	In.
Sandstone, massive, visible, Pierpont		5	0
Coal, slaty.....	0' 2 "		
Coal, soft, columnar.....	0 10¼		
Slate.....	0 1½		
Coal, soft, columnar.....	1 9		
Slate, 0" to.....	0 0¼		
Coal, medium soft (shale floor)0	6	3	5

Walter Smith Coal Opening—No. 82 on Map II.

On point 0.2 mile southwest of Opening No. 781; **No. 6 Pocahontas Coal**; elevation, 2460' B.

			Ft.	In.
1.	Sandstone, Pierpont , massive, grayish brown, hard, forms cliff.....		40	0
2.	Coal, slaty.....	0' 2 "		
3.	Coal, soft, columnar.....	0 11		
4.	Slate, coaly.....	0 1½		
5.	Coal, soft, columnar.....	1 10		
6.	Coal, harder, columnar (shale floor).....	0 4½	3	5

Gawthrop collected a sample for analysis from Nos. 3, 5 and 6 only at the above opening, 100 feet back into the hill, the composition of which is published under **No. 82** in the first table of coal analyses at the end of this Chapter. The results indicate a coal of exceptional purity. In this region the bed belongs about 180 feet above the No. 3 Pocahontas Coal.

Coal Opening—No. 782 on Map II.

On south hillside of Barkers Creek, 0.9 mile southwest of Opening No. 781 above; **No. 6 Pocahontas Coal**; elevation, 2655' B.

			Ft.	In.
	Sandstone, visible.....		5	0
	Coal, slaty.....	0' 2 "		
	Coal, columnar.....	0 11½		
	Slate, coaly.....	0 2		
	Coal, columnar.....	2 6½		
	Coal, hard, bony (to shale floor).....	0 4½	4	2½

T. J. Shrewsberry Coal Opening—No. 783 on Map II.

On south hillside of Barkers Creek, 2 miles southeast of Basin; **No. 6 Pocahontas Coal**; elevation, 2720' B.

			Ft.	In.
	Shale, brownish gray.....		10	0
	Coal, soft, columnar.....	1' 10"		
	Coal, harder, columnar.....	1 10		
	Coal, hard, bony (to shale floor).....	0 7	3	3

**Pocahontas Coal & Coke Co. Coal Prospect—No. 784
on Map II.**

On north slope of Milam Ridge, 0.6 mile northwest of Black, and 3.5 miles northeast of Clarks Gap; **No. 6 Pocahontas Coal**; elevation, 2760' B.

		Ft.	In.
Shale, bluish gray, visible.....		12	0
Coal, soft, columnar.....	0' 11"		
Slate.....	0 1		
Coal, soft, columnar.....	1 5		
Coal, medium soft (to shale floor).....	0 4	2	9

**Pocahontas Coal & Coke Co. Coal Prospect—No. 785 on
Map II.**

On north slope of Milam Ridge, 0.4 mile west of Prospect No. 784 above; **No. 6 Pocahontas Coal**; elevation, 2720' B.

		Ft.	In.
Shale, bluish gray, visible.....		10	0
Coal, soft, columnar.....	1' 1"		
Shale, dark.....	0 5		
Coal, soft, columnar.....	1 9		
Coal, medium soft (shale floor).....	0 4	3	7

Gawthrop reports the coal rising rapidly to the south-east at the above opening.

Coal Opening—No. 786 on Map II.

East side of hill road, 1.5 miles south of Basin and 3 miles northeast of Herndon; **No. 6 Pocahontas Coal**; elevation, 2670' B.

		Ft.	In.
Shale, bluish gray, visible.....		5	0
Coal, soft, columnar.....	1' 3"		
Shale, dark gray.....	1 2		
Coal, soft, columnar (to shale floor).....	2 1	4	6

Coal Opening—No. 787 on Map II.

On west hillside of Milam Fork, 2.1 miles southwest of Basin and 2.4 miles northeast of Herndon; **No. 6 Pocahontas Coal**; elevation, 2590' B.

	Ft.	In.
Sandstone, Pierpont , massive, forms cliffs, visible	15	0
Concealed.....	25	0
Coal, soft, columnar (to shale floor).....	3	11

Coal Opening—No. 788 on Map II.

On east hillside of Milam Fork, 0.6 mile northward from Opening No. 787; **No. 6 Pocahontas Coal**; elevation, 2500' B.

	Ft.	In.
Sandstone, Pierpont , massive, making cliff, visible	20	0
Concealed.....	20	0
Shale, bluish gray.....	8	0
Coal , soft, columnar.....3' 2"		
Coal , harder (to shale floor)..0 4	3	6

Coal Opening—No. 789 on Map II.

On west bank of Milam Fork, 2 miles northeast of Herndon, 1¼ miles southeast of mouth of Comer Branch; **No. 6 Pocahontas Coal**; elevation, 2280' B.

	Ft.	In.
Concealed.....		
Coal , soft, columnar.....3' 4"		
Coal , medium soft, columnar..0 6	3	10
Shale and concealed to bed of Milam Fork.....	5	0

Coal Opening No. 790 on Map II, in the **No. 6 Pocahontas** bed, just southwest of the west portal of the Virginian Railway tunnel at Clarks Gap at an elevation of 2665' B., as determined by the writer, was closed in 1914, and the thickness of the seam not learned. The following opening was examined by Gawthrop on Pinnacle Creek:

Coal Opening—No. 83 on Map II.

On north hillside of Pinnacle Creek, edge of road, 2.1 miles west of Clarks Gap; **No. 6 Pocahontas Coal**; elevation, 2500' B.

	Ft.	In.
Shale.....		
Coal , soft, columnar.....1' 3"		
Coal , medium soft, columnar (shale floor).....2 2	3	5

Gawthrop collected a sample for analysis from the entire bed section at the above opening, 50 feet from mouth at working face, the composition of which is published under **No. 83** in the first table of coal analyses at the end of this Chapter.

Sandy River District, McDowell County.

In Sandy River, the No. 6 Pocahontas Coal lies below drainage in every portion of the District, the only source of information as to its thickness and character being the logs of Coal Test Borings Nos. 38 and 39 on Map II, the details of which are published in Chapter IV in connection with the Avondale and Bradshaw Sections, pages 93-6 and 96-9, respectively. These fail to report this bed in minable thickness and constitute the authority for the barren area designated on Figure 8, page 381.

Browns Creek District, McDowell County.

In Browns Creek District, the No. 6 Pocahontas Coal does not appear to attain minable dimensions and regularity as is revealed by the sections described below and the logs of Coal Test Borings Nos. 54, 56 and 60, published on preceding pages of this Chapter.

The three following exposures of this bed along Elkhorn Creek were examined by the writer:

Coal Exposure—No. 791 on Map II.

On north bank of Elkhorn Creek, $\frac{3}{4}$ mile southeast of Olmsted;
No. 6 Pocahontas Coal; elevation, 1380' B.

	Ft.	In.
Shale, dark, fossil plants abundant, visible.....	3	0
Coal, soft.....0' 11"		
Shale, dark gray.....0 0 $\frac{1}{4}$		
Coal, soft.....1 0 $\frac{3}{4}$	2	0
<hr/>		
Sandstone, Eckman , massive, bluish gray, mica- ceous, fine to medium grained.....	30	0
Concealed to bed of Elkhorn Creek.....	15	0
Interval to No. 3 Pocahontas Coal, about.....	160	0

Coal Exposure—No. 792 on Map II.

At southeast portal of Dixopoca railroad tunnel, 0.5 mile southeast
of Exposure No. 791; **No. 6 Pocahontas Coal**; elevation, 1435' B.

	Ft.	In.
Sandstone, Pierpont	70	0
Shale, dark.....	40	0

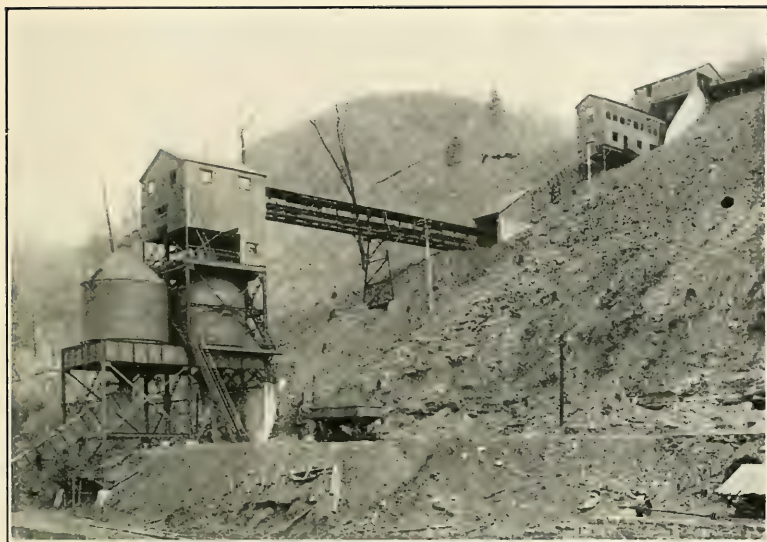


PLATE XXIX(a)—Showing form of tippie used by U. S. Coal & Coke Co. at Mine 119 on Map II, 1 mile northeast of Thorpe, and topography of the Pocahontas Group.—Photo by courtesy of H. N. Eavenson.

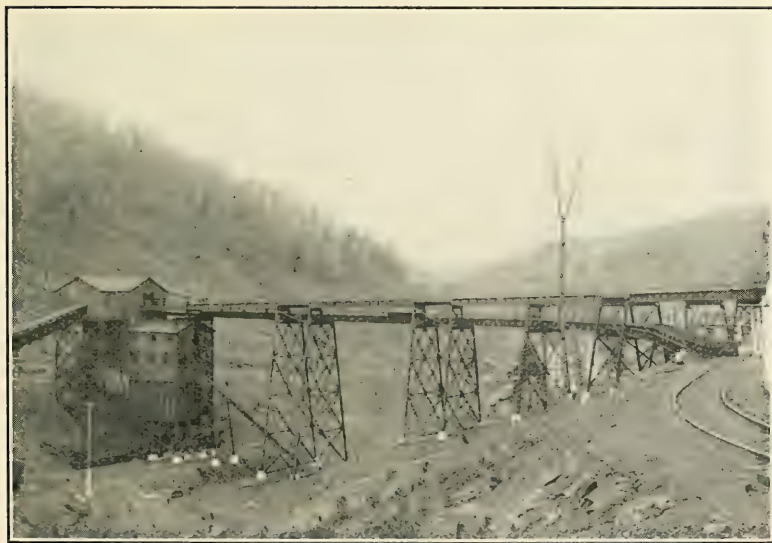


PLATE XXIX(b)—Ditto, at Mine 93 on Map II, Filbert, McDowell County.—Photo by courtesy of H. N. Eavenson.

			Ft.	In.
Coal.....	0'	3"		
Slate, gray...	0	1		
Coal.....	0	5	No. 6 Pocahontas (1435' B.)	0 9
Sandstone, massive, Eckman.....			34	0
Coal.....	0'	8"		
Slate.....	0	0½		
Coal.....	1	0		
Shale, sand.....	1	0		
Coal.....	0	2	No. 5 Pocahontas..	2 10½
Sandstone, massive, bluish gray, to railroad grade			17	0

Coal Exposure—No. 793 on Map II.

On north bank of Elkhorn Creek, 0.6 mile northeast of Big Four;
No. 6 Pocahontas Coal; elevation, 1545' B.

	Ft.	In.
Sandstone	20	0
Coal, slaty, mostly slate, No. 6 Pocahontas.....	2	6
Sandstone, massive, bluish gray, large concretions	57	0
Coal, No. 5 Pocahontas (1495' B.).....	2	10
Sandstone, massive, bluish gray, to road.....	15	0

Big Creek District, McDowell County.

In Big Creek District, the No. 6 Pocahontas Coal does not appear to attain minable thickness and purity as may be seen at a glance in the table of borings for McDowell County, pages 290-3, as also in the detailed records of these tests on the pages following that table. The general sections in Chapter IV for Jacob Fork, Berwind, Vall Creek, Bearwallow Knob—2 Miles East and Horsepen Creek show this bed thin and worthless. Its thickness at **Coal Exposure No. 794 on Map II**, at Berwind Station, is shown in the description of Coal Exposure No. 771 on Map II, at this point, on a preceding page, under the discussion of the No. 7 Pocahontas seam in the same District.

Adkin District, McDowell County.

In Adkin District, the minable area of the No. 6 Pocahontas Coal appears to be confined to several scattered patches along the eastern border as shown on Figure 8. Its thickness and stratigraphic position in the western portion are exhibited in the logs of Coal Test Borings Nos. 136-138, 145, 159, 163-4,

169 and 173 on Map II, the details of which are published on preceding pages of this Chapter, as also the depth and thickness in the table of borings for McDowell County. The following opening was examined by Gawthrop:

Coal Opening—No. 795 on Map II .

In edge of Virginia, west hillside of Coal Run, 2 miles northwest of Pocahontas; **No. 6 Pocahontas Coal**; elevation, 2615' B.

	Ft.	In.
Shale, bluish gray, 2' to.....	3	0
Slate, cannel.....	0	5
Coal, medium soft.....	1	7

The following exposure was examined by Gawthrop:

Coal Exposure—No. 797 on Map II.

In ridge road, 0.8 mile northwest of common corner of McDowell, Mercer and Tazewell Counties; **No. 6 Pocahontas Coal**; elevation, 2605' B.

	Ft.	In.
Coal blossom, heavy, visible.....	2	6

North Fork District, McDowell County.

In North Fork District, the No. 6 Pocahontas Coal appears to attain minable dimensions over the greater portion, as shown on Figure 8. Its stratigraphic position in this region is shown in the Crumpler Section, page 124. The two following exposures were examined by Gawthrop:

Coal Opening No. 798 on Map II, in the No. 6 Pocahontas Coal, on the south hillside of North Fork at Crumpler (Burkes Garden), at an elevation of 2609' L., had fallen shut and the thickness of the bed not obtained. The same was true at **Coal Exposure No. 799 on Map II**, in this seam, on the northwest hillside of the Windmill Gap Branch, 1¼ miles southeast of Ashland, at an elevation of 2590' B. In these portions of North Fork District, this seam is reported to range in thickness from 30 to 50 inches.

Elkhorn District, McDowell County.

In Elkhorn District, no exposures of the No. 6 Pocahontas Coal were examined, but in the region indicated on Figure 8, it is believed to possess practically the same character as in the area last described.

Quantity of No. 6 Pocahontas Coal Available.

Based on the foregoing evidence and a determination by Gawthrop of the area indicated on Figure 8, page 381, the following estimate is made for the amount of No. 6 Pocahontas Coal available in both Counties:

Probable Amount of No. 6 Pocahontas Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Slab Fork.....	2	40.0	25,600	2,230,272,000	89,210,880
Barkers Ridge...	2	35.0	22,400	1,951,488,000	78,059,520
Totals.....	.....	75.0	48,000	4,181,760,000	167,270,400
McDowell:					
Adkin	2	8.0	5,120	446,054,400	17,842,176
North Fork.....	2	10.0	6,400	557,568,000	22,302,720
Elkhorn	2	6.0	3,840	334,540,800	13,381,632
Totals.....	.....	24.0	15,360	1,338,163,200	53,526,528
Totals for Both Counties		99.0	63,360	5,519,923,200	220,796,928

NO. 5 POCAHONTAS COAL.

The No. 5 Pocahontas Coal, described in Chapter VII, page 223, is of secondary importance, since, as a minable bed, it appears to be confined to a small area in Big Creek District, McDowell County, as shown on Figure 9, page 383, along with that for the Chilton bed, except a possible additional acreage on Sugarcamp and Grapevine Branches of Tug Fork, northeast and northwest of Wilcoe, where the logs of Coal Test Borings Nos. 141, 143 and 145 on Map II indicate a coal

of minable dimensions at this horizon. The U. S. Coal & Coke Co. has thoroughly prospected Adkin and the southeast half of Big Creek District, for all the minable seams, but the most of these diggings were closed in 1914 when visited by Gawthrop. The data collected by this company and furnished the Survey by Mr. H. N. Eavenson, its Chief Engineer, on a large scale map—1600 feet to the inch—showing the thickness and spirit-level elevation of numerous prospect openings and location of borings, as also accurately determined contours of the No. 3 Pocahontas Coal, constituting the authority for the approximate minable areas designated for the No. 5 Pocahontas seam on Figure 9.

In **Wyoming County**, the thickness and stratigraphic position of the latter coal are exhibited in the logs of Coal Test Borings Nos. 8, 10, 12, 16 and 21 on Map II. These, in connection with exposures of the horizon of the No. 5 Pocahontas seam, corroborate the barren area indicated for this bed on the Figure last mentioned.

In **Sandy River District**, McDowell County, its absence in minable dimensions is indicated by the logs of Coal Test Borings Nos. 38 and 39 on Map II, used in connection with the sections, in Chapter IV, for Avondale and Bradshaw, pages 93-6 and 96-9, respectively.

Browns Creek District, McDowell County.

In Browns Creek, the thickness and stratigraphic position of the No. 5 Pocahontas Coal are exhibited in the logs of Coal Test Borings Nos. 56 and 60 on Map II. In the eastern portion of the District, along Elkhorn Creek, the four following exposures were examined by the writer:

Coal Prospect—No. 803 on Map II.

South portal of Dixopoca railroad tunnel; **No. 5 Pocahontas Coal**; elevation, 1400' B.

		Ft.	In.
Coal, No. 6 Pocahontas.....		1	0
Sandstone, massive.....		34	0
Coal.....	0' 8"		
Slate.....	0 0½		
Coal.....	1 0		

			Ft.	In.
Slate, sandy.....	1'	0"		
Coal.....	0	2	2	10½
Sandstone to N. & W. Ry. grade.....			17	0

Coal Exposure—No. 804 on Map II.

In road, north bank of Elkhorn Creek, 0.6 mile northeast of Big Four; **No. 5 Pocahontas Coal**; elevation, 1485' B.

			Ft.	In.
Sandstone.....				
Coal.....	1'	0"		
Slate.....	0	1		
Coal.....	0	2		
Slate, gray, silicious.....	1	0		
Coal, slaty.....	0	7	2	10
Sandstone, massive, gray, to road.....			12	0

Coal Exposure—No. 805 on Map II.

At west portal of Kimball railroad tunnel; **No. 5 Pocahontas Coal**; elevation, 1535' B.

		Ft.	In.
Sandstone, bluish gray.....			
Coal (to sandstone).....		1	3

Coal Exposure—No. 806 on Map II.

At east portal of Kimball railroad tunnel; **No. 5 Pocahontas Coal**; elevation, 1515' B.

			Ft.	In.
Sandstone, Eckman , bluish gray, medium grained, massive, cliff.....			50	0
Coal, slaty.....	0'	5"		
Coal.....	0	11		
Bone.....	0	2		
Coal.....	0	10	2	4
Sandstone, massive, bluish gray, medium to fine grained.....			55	0
Concealed and horizon of No. 4 Pocahontas Coal bed of Elkhorn Creek.....			5	0

Big Creek District, McDowell County.

In Big Creek, the No. 5 Pocahontas Coal attains minable dimensions over two separate areas in the southeast half of the District, as shown approximately on Figure 9. Its thickness and stratigraphic position are exhibited in the general sec-

tions, in Chapter IV, for Jacob Fork, Berwind, Head of Vall Creek, Bearwallow Knob and Horsepen Creek, and in the logs of Coal Test Borings Nos. 65, 66, 71-74, 77, 83, 90, 91, 96, 98-101, 105-111, 115, 121-123, 127, 130 and 132 on Map II. These, in conjunction with the data furnished by Mr. Eavenson, as mentioned on a preceding page at the beginning of the discussion of this coal, and the following exposure, examined by Gawthrop, constitute all the information obtained for this seam:

Coal Exposure—No. 807 on Map IX.

On north bank, 0.1 mile up Long Branch of Big Creek, $4\frac{1}{4}$ miles northeast of Berwind; **No. 5 Pocahontas Coal**; elevation, 1590' B.

	Ft.	In.
Sandstone, massive top, flaggy bottom, visible...	20	0
Coal, soft, columnar.....	1	2
Shale and concealed to run.....	25	0

Adkin District, McDowell County.

In Adkin District, the No. 5 Pocahontas Coal appears fairly persistent but quite irregular in thickness. Its dimensions and stratigraphic position are exhibited in the logs of Coal Test Borings Nos. 133, 134, 141, 143, 145, 146, 159, 163, 164, 166, 168 and 169, all on Map II. It seems to attain minable dimensions on Sugarcamp and Grapevine Branches and on the head of Adkin Branch, as shown by the records of the foregoing tests.

Quantity of No. 5 Pocahontas Coal Available.

Based on the evidence in the foregoing pages and a determination by Gawthrop of the area designated on Figure 9, the following estimate is made for the probable amount of the No. 5 Pocahontas Coal available:

Probable Amount of No. 5 Pocahontas Coal.

McDowell County by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Big Creek.....	3	22.00	14,080	1,839,974,400	73,598,976

THE NO. 4 POCAHONTAS COAL.

The No. 4 Pocahontas Coal, described in Chapter VII, pages 223-4, is a very important seam in the territory of this Report, especially in McDowell County, where it has been mined quite extensively on a commercial scale. In quality, it differs but little from the great No. 3 Pocahontas bed, below it, as may be readily seen in the tables of analyses at the end of this Chapter. Its approximate minable area is outlined on Figure 27 along with that for the Bens Creek

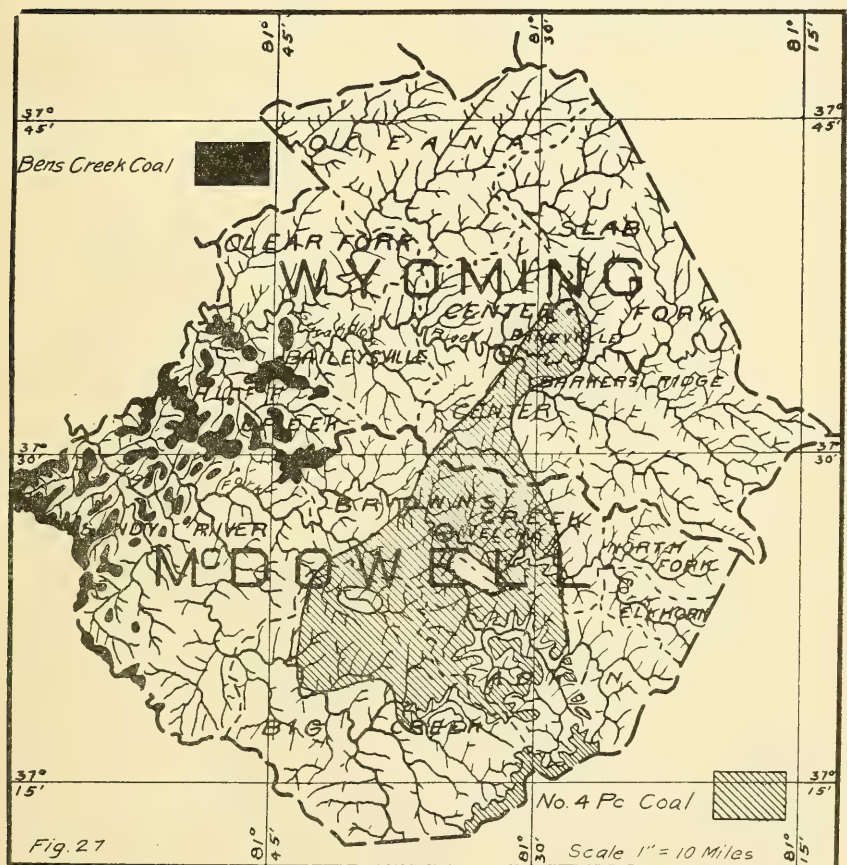


Figure 27.—Showing Approximate Movable Area of the No. 4 Pocahontas and Bens Creek Coals (See explanations in Author's Preface).

Coal. It has been prospected extensively in both Counties by bore holes and diggings at crop exposures, which constitute the authority for its merchantable area as defined on the Figure last mentioned. As mentioned under the discussion of the No. 5 Pocahontas bed on a preceding page of this Chapter, a large fund of information as to its minable limits was furnished by Mr. H. N. Eavenson. Since it belongs less than 100 feet above the No. 3 Pocahontas seam whose outcrop is shown in detail on Map II, that for the No. 4 Pocahontas Coal should follow closely the same regions. Its thickness and character at prospect openings, country banks and commercial mines will now be discussed by magisterial Districts.

Slab Fork District, Wyoming County.

In Slab Fork, the No. 4 Pocahontas Coal is fairly persistent but appears to attain minable dimensions in only the southwest edge of the District. Its thickness and stratigraphic position are exhibited in the Cabin Creek Ridge (**at Coal Exposure No. 808 on Map II**) and Left Fork of Allen Creek Sections, in Chapter IV. pages 67-8 and 72-4, respectively, and in the logs of Coal Test Borings Nos. 7 and 8 on Map II.

The following exposure was examined by the writer:

Coal Exposure—No. 809 on Map II.

In Virginian Railway cut, $1\frac{1}{4}$ miles southeast of Pierpont, and 0.3 mile northwest of mouth of Cedar Creek; **No. 4 Pocahontas Coal**; elevation, 1560' B.

	Ft.	In.
Shale, visible.....	1	0
Coal, soft, columnar.....	2	11
Fire clay.....	2	0

Center District, Wyoming County.

In Center, the No. 4 Pocahontas Coal appears to attain minable dimensions in a narrow belt extending southeastward across the southeast half of the District. Its thickness and stratigraphic position are exhibited in the Pineville—Sugar

Run Section, pages 74-6, and in the logs of Coal Test Borings Nos. 16, 17A, 18, 20 and 21 on Map II, these constituting the authority for the minable area as indicated on Figure 27. The following opening on it was examined by the writer:

Coal Opening—No. 810 on Map II.

On north side of Guyandot River, 0.2 mile northwest of mouth of Cabin Creek; **No. 4 Pocahontas Coal**; elevation, 1440' B.

		Ft.	In.
Sandstone, shaly at top, massive at bottom.....		8	0
Coal, slaty.....	0' 2½"		
Shale, gray.....	1 0		
Shale, with coal streaks.....	0 10		
Coal, slaty.....	0 2		
Coal, soft, columnar.....	2 11½		
Coal, slaty.....	0 2		
Coal, soft, columnar (slate floor).....	0 5	5	9

The composition of a sample from the above opening, collected by M. A. Miller and analyzed by H. Froehling, as published on page 230 of Bulletin 2 of the W. Va. Geological Survey Reports, is as follows:

	Per cent.
Moisture.....	2.95
Volatile Matter.....	21.15
Fixed Carbon.....	69.85
Ash.....	6.05
Total.....	100.00
Sulphur.....	0.158
Phosphorus.....	0.001

Barkers Ridge District, Wyoming County.

In Barkers Ridge the No. 4 Pocahontas Coal in minable dimensions and regularity appears to be confined to the western point of the District, as shown on Figure 27. Its thickness and stratigraphic position are exhibited in the Mouth of Whiteoak Branch Section, pages 81-2, and in the logs of Coal Test Borings Nos. 24, 25 and 25A. The following exposure of this bed was examined by the writer:

Coal Exposure—No. 811 on Map II.

On south bank of Guyandot River, 0.9 mile westward from mouth of Cabin Creek; No. 4 Pocahontas Coal; elevation, 1330' B.

		Ft.	In.
Sandstone, grayish white, hard, visible.....		20	0
Coal, very slaty.....	0' 2"		
Shale, dark, with thin coal streaks.....	0 6		
Coal, slaty.....	0 1		
Coal, soft (to slate and sandstone).....	3 10	4	7

About 75 feet westward and 5 feet lower in elevation, the bed showed the following section:

		Ft.	In.
Sandstone, grayish white, hard, visible.....		20	0
Shale, with coal streaks.....	0' 8"		
Coal, medium soft, columnar..	2 0		
Bone.....	0 2		
Coal, medium soft, columnar..	1 10	4	8
Slate and sandstone.....			

The following prospect was examined by Gawthrop:

Coal Prospect—No. 812 on Map II.

On south hillside of Barkers Creek, 1.1 miles southeast of Basin; No. 4 Pocahontas Coal; elevation, 2575' B.

		Ft.	In.
Concealed.....			
Coal, reported.....	1' 6"		
Bone and slate (to shale floor).....	0 6	2	0

The above prospect belongs about 80 feet above the horizon of the No. 3 Pocahontas coal.

Browns Creek District, McDowell County.

In Browns Creek, the No. 4 Pocahontas Coal attains minable dimensions over a considerable portion of the District, as shown on Figure 27. Its thickness and stratigraphic position are exhibited in the Cub Branch—Pando and Welch Sections, in Chapter IV, pages 104 and 106, respectively, and in

the logs of Coal Test Borings Nos. 45, 52, 54, 56, 58, 59, 60, 62 and 63 on Map II, given both in the table and in detail on preceding pages of this Chapter.

The following commercial mine in the No. 4 Pocahontas Coal was examined by Gawthrop:

Houston Coal & Coke Co. (Hugar)—No. 157 on Map II.

Browns Creek District, at Olmsted; No. 4 Pocahontas Coal.

			Ft.	In.
1.	Sandstone.....			
2.	Slate with coal streaks...0'	4"		
3.	Coal	0	2	
4.	Bone, 0' 1" to.....	0	0½	
5.	Coal, gray.....	0	1½	
6.	Coal, soft, columnar.....	1	8	
7.	Bone	0	3	
8.	Coal, soft, columnar.....	1	6½	
9.	Bone	0	1½	
10.	Coal, soft, columnar.....	1	1	5 4
11.	Shale and concealed.....			

"Tidal elevation, 1150' B.; coal owned by Consolidation Coal Co., of Fairmont; principal office, Cincinnati, Ohio; daily capacity, 800 tons; daily output, 800 tons; 50 laborers and 90 miners employed; electric haulage; used for steam, coke and domestic fuel; shipped East and West; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; Thomas Leman, Superintendent, authority for data." Note—150 ovens at plant, 52 in blast."

The composition of a sample from the above mine, as published on page 115 of Bulletin 85 of the U. S. Bureau of Mines, is republished under No. 157 in the second table of coal analyses at the end of this Chapter.

In the table below is given not only a list of three commercial mines in the No. 4 Pocahontas Coal, on Elkhorn Creek, in Browns Creek District, that had been sampled previous to 1914, and their descriptions and analyses published in other Reports, but also the No. of the mine on Map II; its elevation above sea level, and the page of the particular Report on which the results are found. The analyses are republished under the corresponding mine Nos. on Map II in the two tables of coal analyses at the end of this Chapter:

Mine No. on Map II.	Elevation Above Sea Level	Name of Company.	Location.	Other Survey Reports—Refer- ences to Description.
84	1174L	Lake Superior Coal Co. No. 1.	Olmsted, 0.5 mi. S.E.	W. Va., Vol. II(A) pp. 159-160.
157	1150B	Houston Coal & Coke Co. (Hugar)	Olmsted	U. S. B. M., Bull 85, p. 115.
158	—	Lake Superior Coal Co. No. 2.	Olmsted, 0.7 mi. S.E.	W. Va., Bull. 2, p. 235, No. 1.

The following exposure was examined by the writer:

Coal Exposure—No. 813 on Map II.

At entrance to old slope, on north bank of Belcher Branch, 0.4 mile northeast of Big Four; **No. 4 Pocahontas Coal**; elevation, 1445' B.

			Ft.	In.
Coal.....	1'	7"		
Bone.....	0	3		
Coal.....	0	9		
Bone.....	0	1		
Coal.....	1	4	4	0

Unrecorded and **No. 3 Pocahontas Coal** at old abandoned Mine No. 1 of the Cirrus Coal & Coke Co. 70 0

The following commercial mine was examined by Gawthrop:

Houston Coal & Coke Co. No. 2 (Shaft)—No. 85 on Map II.

Browns Breck District; 1 mile north of Kimball; **No. 4 Pocahontas Coal**.

			Ft.	In.
1. Unrecorded and shale from top of shaft.....			230	0
2. Shale with coal streaks.....			2	0
3. Coal, soft, columnar.....	0'	9"		
4. Bone.....	0	0 1/4		
5. Coal, medium hard, columnar.....	1	0		
6. Bone.....	0	1 1/2		
7. Coal, soft, columnar.....	0	6		
8. Bone.....	0	1		
9. Coal, soft, columnar.....	1	6 1/4	4	0
10. Shale, unrecorded and coal to base of No. 3 Pocahontas			65	0

"Total elevation, 1335' B.; sample collected from Nos. 3, 5, 7 and 9 of section at face of Main Air Course by R. M. Gawthrop; William Prentice, Foreman, authority for data. See Mine No. 2 in No. 3 Pocahontas Coal for other data."

The composition of the sample collected at the above mine is published under **No. 85** in the table of coal analyses at the end of this Chapter.

The following exposure was examined by the writer:

Coal Exposure—No. 814 on Map II.

On edge of road, just north of West Vivian Railway Station; **No. 4 Pocahontas Coal**; elevation, 1495' B.

		Ft.	In.
Sandstone.....		40	0
Shale.....		2	0
Coal, slaty.....		0	2
Shale, sandy.....		6	0
Coal soft.....	1' 7"		
Bone.....	0 1		
Coal, soft.....	0 5		
Bone.....	0 1		
Coal, soft.....	0 6		
Bone.....	0 1		
Coal, soft (to fire clay shale).....	0 7	4	4

The following prospect was examined by Gawthrop:

Coal Prospect—No. 815 on Map II.

On east bank, 0.8 mile up Bottom Creek, 0.9 mile east of Kimball; **No. 4 Pocahontas Coal**; elevation, 1625' B.

		Ft.	In.
Shale, gray, silicious.....		2	0
Bone.....	0' 2"		
Coal, medium soft.....	0 9½		
Shale.....	0 0½		
Coal, medium soft.....	0 9		
Shale.....	0 2		
Coal, soft.....	0 5		
Coal, slaty.....	0 3		
Bone.....	0 4		
Coal, medium soft (to shale).....	0 6	4	5

Big Creek District, McDowell County.

In Big Creek District, the No. 4 Pocahontas Coal attains minable dimensions over quite a large boundary, as shown on Figure 27. Its thickness and stratigraphic position are exhibited in the sections given in Chapter IV for Jacob Fork, Long Branch, Head of Vall Creek and Two Miles East of

Bearwallow Knob, and in the logs of Coal Test Borings Nos. 65-132, inclusive, on Map II, the details of which are published on preceding pages of this Chapter and briefly in the table of borings for McDowell County, pages 290-3. The following commercial mine was examined by Gawthrop:

Carter Coal Co. (Coalwood Shaft)—No. 86 on Map II.

Big Creek District, 0.8 mile southeast of Coalwood; **No. 4 Pocahontas Coal.**

		Ft.	In.
1.	Unrecorded and sandstone from top of shaft..	576	0
2.	Shale, 0" to.....	1	6
3.	Coal, soft, with streaks of mother coal and sometimes sulphur.....1'	0"	
4.	Sulphur band.....0	0½	
5.	Coal, soft.....1	0	
6.	Bone	3	
7.	Coal, gray.....0	6	
8.	Coal, medium soft.....3	0	
9.	Bone, 0" to.....0	0½	
10.	Coal, medium soft.....0	10	6 8
11.	Shale and concealed.....		

"Tidal elevation, 930' L.; coal owned by Carter Coal Co.; principal office Johnston City, Tenn.; 25 laborers and 10 miners employed; electric haulage; used for steam at mine; no butts or faces; greatest rise, southeast; sample collected from Nos. 2, 5, 7, 8 and 10 of section at face of Main Entry, 600' from shaft, by R. M. Gawthrop; J. L. Bishop, Superintendent, authority for data. Mine not yet open for shipment."

The composition of the sample collected at the above mine is published under **No. 86** in the first table of analyses at the end of this Chapter.

The six following diggings in Big Creek District were examined by Gawthrop:

Coal Prospect—No. 816 on Map II.

On east bank of Big Creek, 0.5 mile southeast of mouth of Long Branch and 4 miles northeast of Berwind; **No. 4 Pocahontas Coal**; elevation, 1595' B.

	Ft.	In.
Shale, gray, silicious, visible.....	5	0
Shale, black, slaty.....	2	6
Coal, medium soft.....	1	8
Shale and concealed to run.....	30	0

Coal Opening—No. 817 on Map II.

On east bank of Long Branch, 1 mile southeast of mouth of Turkeywing Branch, and $1\frac{1}{4}$ miles southwest of Filbert; **No. 4 Pocahontas Coal**; elevation, 1780' B.

		Ft.	In.
Shale.....	0'		
Coal, columnar.....	6 $\frac{1}{2}$ "		
Shale.....	0		
Coal, columnar.....	3 $\frac{1}{2}$		
Shale.....	0		
Coal.....	2 $\frac{1}{2}$		
Bone.....	3		
Coal, soft, columnar.....	7		
Coal, medium hard, gray.....	3		
Coal, soft, columnar.....	1	8	3
<hr/>			
Shale and concealed.....			

Coal Prospect—No. 818 on Map II.

On west side of Long Branch, 0.3 mile due south of Opening No. 817 above; **No. 4 Pocahontas Coal**; elevation, 1875' B.

		Ft.	In.
Concealed and shale.....			
Slate and bone.....	3"		
Coal, medium soft.....	10		
Coal, gray.....	4		
Coal, visible.....	0	4	5
<hr/>			
Coal, concealed.....			

Coal Prospect—No. 819 on Map II.

On north bank of Middle Fork of Big Creek, $1\frac{1}{4}$ miles eastward from Squirejim; **No. 4 Pocahontas Coal**; elevation, 2095' B.

		Ft.	In.
Sandstone, massive, gray, broken, visible.....		4	0
Shale, bluish gray, slaty.....		2	0
Coal, medium soft, columnar.....	2'	2"	
Coal, soft, columnar.....	1	8	3
<hr/>			
Shale and concealed.....			

Coal Opening—No. 820 on Map II.

On east side of Road Fork, and road, 0.8 mile southward from Squirejim; **No. 4 Pocahontas Coal**; elevation, 1995' B.

		Ft.	In.
Sandstone, shaly, visible.....		5	0
Shale, bluish gray.....		5	0
Coal, medium soft, columnar.....	0'	10"	
Coal, soft, columnar.....	3	5	3
<hr/>			
Slate and shale.....			

Coal Opening—No. 821 on Map II.

On west side of Jacob Fork, 0.7 mile northwest of mouth of Horsepen Creek; **No. 4 Pocahontas Coal**; elevation, 1765' B.

			Ft.	In.
Shale, gray, visible.....			5	0
Coal, medium soft, columnar..	2'	0"		
Coal, harder.....	0	4		
Coal, medium soft, columnar..	1	8		
Coal, very soft (to slate and concealed).....	0	3	4	3

The following opening was examined by the writer:

Coal Opening—No. 822 on Map II.

On west side of Jacob Fork, 0.35 mile northwest of Opening No. 821 above; **No. 4 Pocahontas Coal**; elevation, 1780' B.

		Ft.	In.
Shale, dark, many plant fossils, visible.....		5	0
Coal, soft, clean (to gray shale).....		4	7

The two following exposures in the same District were examined by Gawthrop:

Coal Opening—No. 823 on Map II.

In run on east side of Jacob Fork, 0.6 mile northwest of Opening No. 821 above; **No. 4 Pocahontas Coal**; elevation, 1840' B.

			Ft.	In.
Shale, gray, silicious, visible.....			8	0
Coal, medium soft, columnar..	2'	7"		
Bone, 0½" to.....	0	0		
Coal, soft, columnar.....	1	6		
Coal, very soft.....	0	3	4	4

Shale and concealed.....

Coal Exposure—No. 824 on Map II.

In run on west side of Jacob Fork, 1.6 miles southeast of Squire; **No. 4 Pocahontas Coal**; elevation, 1925' B.

			Ft.	In.
Shale, dark, silicious, visible.....			10	0
Coal, medium soft, columnar..	3'	0"		
Coal, soft, columnar.....	1	3	4	3

Shale and concealed.....

Adkin District, McDowell County.

In Adkin District, the No. 4 Pocahontas Coal has been mined quite extensively on a commercial scale. Its thickness and stratigraphic position are exhibited in the Spice Creek Section (**at Prospect No. 825 on Map II**), in Chapter IV, page 122, and in the logs of Coal Test Borings Nos. 133-173, inclusive, on Map II, the details of which are published on preceding pages of this Chapter, and partially in the table of borings for McDowell County, pages 290-3.

The following table gives not only a list and the locations of nine commercial mines in the No. 4 Pocahontas Coal in Adkin District that had been sampled previous to 1914 by the writer, but their Nos. on Map II, their elevation above sea level, and the page of Volume II(A) of the State Survey Reports on which the descriptions occur. The compositions of the samples are republished in the first table of coal analyses at the end of this Chapter under the corresponding Nos. on Map II:

Mine No. on Map II.	Elevation Above Sea Level	Name of Company.	Location.	Page Reference to Vol. II(A)
87	1341L	U. S. C. & C. Co. No. 1	Wilcoe, 0.4 mi. N.E.	160
88	1462L	U. S. C. & C. Co. No. 2	Gary, 0.5 mi. W.	161
89	1548L	U. S. C. & C. Co. No. 3	Gary, 0.9 mi. N.E.	161
90	1572L	U. S. C. & C. Co. No. 6	Ream, 0.4 mi. W.	162
91	1636L	U. S. C. & C. Co. No. 7	Elbert, 0.3 mi. N.W.	162-3
92	1700L	U. S. C. & C. Co. No. 8	Elbert, 0.5 mi. S. E.	163
93	1790L	U. S. C. & C. Co. No. 9	Filbert	163-4
94	1683L	U. S. C. & C. Co. No. 11	Gary, 1.5 mi. E.	162
96	2000B	Black Wolf C. & C. Co. (Black Wolf)	Black Wolf, 0.6 mi. S. W.	165 165

U. S. Coal & Coke Co. No. 10—No. 95 on Map II.

Adkin District, 0.5 mile northwest of Thorpe; No. 4 Pocahontas Coal.

		Ft.	In.
1.	Concealed		
2.	Shale, bluish gray.....	10	0
3.	Shale, with coal streaks.....	2	0
4.	Coal, soft, columnar.....0' 3"		
5.	Sulphur bone, 0¾" to.....0 6		
6.	Coal, soft, columnar.....1 10		
7.	Black rash.....0 3½		
8.	Sulphur bone.....0 1½		
9.	Coal	2	
10.	Bone	3	
11.	Coal, soft, columnar.....0 8		
12.	Bone.....0 2		
13.	Coal, soft, columnar.....1 1	4	10
14.	Shale and concealed and coal to base of No. 3 Pocahontas.....	65	0

"Tidal elevation, 1640' B.; coal owned by Pocahontas Coal and Coke Co.; principal office, Gary; daily capacity, 900 tons; daily output, 450 tons; 32 laborers and 50 miners employed; mule and electric haulage; used for steam and by-product ovens; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample No. 135G collected from Nos. 4, 6, 9, 11 and 13 and No. 135Ga from No. 7, of section at face of 1st Left Heading off 1st Right Haulage by R. M. Gawthrop; H. K. Payne, Assistant Foreman, authority for data. Data given for No. 3 and No. 4 seams of No. 10 Mine."

Sample No. 135Ga from above mine was not analyzed for reasons mentioned on preceding pages of this Chapter. The composition of sample No. 135G is published under No. 95 in the table of coal analyses at the end of this Chapter.

Coal Prospect—No. 826 on Map II.

In hill road, head of Road Fork of South Fork, 2.5 miles southwest of Jenkinjones; No. 4 Pocahontas Coal, elevation, 2224' L.

Coal, 6' 6", and slate 0' 4", as reported by U. S. Coal & Coke Co.

Quantity of No. 4 Pocahontas Coal Available.

Based on the evidence given in the foregoing pages and a determination by Gawthrop of the area as outlined on Figure 27, the following estimate is made for the probable amount of No. 4 Pocahontas Coal available in each County, that having already been mined being disregarded, since it is very small in quantity in proportion to the total coal present for this bed:

Probable Amount of No. 4 Pocahontas Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Slab Fork.....	3	1.0	640	83,635,200	3,345,408
Center	3	20.0	12,800	1,672,704,000	66,908,160
Barkers Ridge..	3	4.0	2,560	334,540,800	13,381,632
Totals.....	.....	25.0	16,000	2,090,880,000	83,635,200
McDowell:					
Browns Creek..	4	40.0	25,600	4,460,544,000	178,421,760
Big Creek.....	5	50.0	32,000	6,969,600,000	278,784,000
Adkin	6	40.0	25,600	6,690,816,000	267,632,640
Totals.....	.....	130.0	83,200	18,120,960,000	724,838,400
Totals for Both Counties.		155.0	99,200	20,211,840,000	808,473,600

Coke From No. 4 Pocahontas Coal.

Coal from the No. 4 Pocahontas bed was once coked quite extensively in bee-hive ovens by the U. S. Coal & Coke Co. on Tug Fork in McDowell County, where it yielded a high-grade product only slightly different from that from the No. 3 Pocahontas seam, but the output from the mines on it is now mostly shipped away for coking in by-product ovens, as discussed on a subsequent page of this Chapter under "**Coke from No. 3 Pocahontas Coal.**" The following is the average of three analyses of three samples of coke manufactured from No. 4 Pocahontas Coal at Mines—Nos. 89, 91 and 92 on Map II—of the U. S. Coal & Coke Co., as published on page 223 of Bulletin 2 of the W. Va. Geological Survey:

	Per cent.
Moisture.....	0.85
Volatile Matter.....	1.41
Fixed Carbon.....	89.08
Ash.....	8.66
Total.....	100.00
Sulphur.....	0.67
Phosphorus.....	0.011

THE NO. 3 POCAHONTAS COAL.

The No. 3 Pocohontas Coal, as described in Chapter VII, pages 226-8, ranks second only in commercial importance to the great Pittsburgh bed among the coal seams of West Virginia. Its approximate minable area, as also its western boundary line west of which it has apparently thinned below minable dimensions and purity, is shown on Figure 28, along with that for the Cedar seam. Its outcrop is given in detail on Map II, as also its elevation above sea level by the red structure



Figure 28.—Showing Approximate Movable Area of the No. 3 Pocahontas and Cedar Coals (See explanations in Author's Preface).

contours, eastward from its 1000-foot level. It has been mined extensively on a commercial scale in each County, especially in McDowell, where it has long enjoyed an excellent reputation for steam and coking purposes. It has also been opened at country banks by natives and prospected quite extensively by the large land holding companies. Its thickness and character at these diggings and likewise at the commercial mines will now be discussed by magisterial Districts.

Center District, Wyoming County.

In Center, the minable area of the No. 3 Pocahontas Coal is confined to the southeastern half of the District, as shown on Figure 28. It lies entirely below drainage, but its thickness and stratigraphic position in this region are exhibited in the logs of Coal Test Borings Nos. 16, 17A, 18, 20 and 21 on Map I, the details of which are given on preceding pages of this Chapter and in the table of borings for Wyoming County, page 268.

Slab Fork District, Wyoming County.

In Slab Fork, the No. 3 Pocahontas Coal in minable thickness and purity appears to be confined to the southeastern portion of the District. Its thickness and stratigraphic position are exhibited in the Maben, Maben—2 Miles Southwest, Left Fork of Allen Creek and Pineville—Sugar Run Sections published in Chapter IV, and in the logs of Coal Test Borings Nos. 2-14, inclusive, on Map II, the details of which are given on preceding pages of this Chapter, and partially in the table of borings for Wyoming County, page 268. This bed has been prospected and mined commercially along the southern border of the District, where it yields a high-grade coal. The two following exposures were examined by the writer:

Coal Prospect—No. 827 on Map II.

On northwest side of Guyandot River, 0.6 mile northeast of Joe Branch P. O.; **No. 3 Pocahontas Coal**; elevation, 1435' B.

	Ft.	In.
Shale, gray, visible.....	1	3

Coal, soft.....	1'	0"	Ft.	In.
Shale, gray.....	0	1		
Coal, soft.....	1	0		
Bone coal.....	0	2		
Coal, soft.....	0	10		
Shale, gray, 0 $\frac{1}{8}$ " to.....	0	0		
Coal, soft (to slate floor).....	1	8	4	9

Coal Opening—No. 828 on Map II.

On north side of Guyandot River, 0.1 mile northwest of mouth of Still Run, and 3 miles west of Mullens; **No. 3 Pocahontas Coal**; elevation, 1430' B.

			Ft.	In.
Sandstone, shaly.....			9	0
Shale, buff, sandy.....			1	0
Coal, soft.....	0'	10"		
Slate, dark gray.....	0	1		
Coal, soft.....	1	9		
Slate, dark gray, 0 $\frac{1}{2}$ " to.....	0	1		
Coal, soft (to slate floor).....	1	5	4	2

The three following commercial mines in the southern edge of the District were visited and sampled by Gawthrop:

Mead Pocahontas Coal Co.—No. 97 on Map II.

Slab Fork District; 1.3 miles southwest of Mullens; **No. 3 Pocahontas Coal**.

			Ft.	In.
1. Shale, gray, silicious, visible.....			5	0
2. Coal, soft, columnar.....	1'	1"		
3. Coal, gray, harder.....	0	1 $\frac{1}{2}$		
4. Coal, soft, columnar.....	0	3 $\frac{1}{2}$		
5. Bone, hard.....	0	3		
6. Coal, soft, columnar.....	2	5	4	2
7. Shale and concealed.....				

"Tidal elevation, 1530' B.; coal owned by Harvey Ewart; principal office, Mullens; daily capacity, 400 tons; daily output, 300 tons; 16 laborers and 64 miners employed; mule haulage; used for steam; shipped East; butts and faces irregular; greatest rise, northeast; sample collected from Nos. 2, 4 and 6 of section in Room No. 3 off 2nd Right Entry by R. M. Gawthrop; J. C. Sullivan, General Manager, authority for data."

The composition of the sample is published under **No. 97** in the first table of coal analyses at the end of this Chapter.

Trace Fork Coal Co. No. 7—No. 98 on Map II.

Slab Fork District, 1.0 mile north of Mullens; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Shale, brownish gray, silicious, visible.....		5	0
2.	Coal, soft, columnar.....0'	10"		
3.	Bone, 1" to.....0	3½		
4.	Coal, soft, columnar.....0	3		
5.	Bone, 0" to.....0	2		
6.	Coal, soft, columnar.....1	9¾		
7.	Sulphur.....0	0¼		
8.	Coal, soft.....0	1½	3	6
9.	Shale and concealed.....			

"Tidal elevation, 1550' B.; coal owned by Trace Fork Coal Co.; principal office, Bramwell; daily capacity, 75 tons; daily output, 50 tons; 10 laborers and 15 miners employed; electric haulage; used for steam; shipped East; butts N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 2, 4, 6 and 8 of section at face of Main Entry by R. M. Gawthrop; H. L. Price, Foreman, authority for data."

The composition of the sample from the above mine is published under **No. 98** in the first table of coal analyses at the end of this Chapter.

Wyoming Coal Co. Property—No. 99 on Map II.

Slab Fork District; 2.3 miles northeast of Mullens; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Sandstone, shaly, visible.....		5	0
2.	Bone.....0'	2"		
3.	Coal, soft, columnar.....0	8		
4.	Coal, gray, blocky.....0	3		
5.	Bone.....0	2		
6.	Coal, medium hard.....0	4		
7.	Coal, soft columnar.....2	2		
8.	Coal, harder.....0	6	4	3
9.	Shale and concealed.....			

"Tidal elevation, 1550' B.; sample collected from Nos. 3, 4, 6, 7 and 8 of section at face of prospect, 20 feet from mouth; mine is not yet in operation."

The composition of the sample from the above mine is published under **No. 99** in the first table of coal analyses at the end of this Chapter. The results of these tests indicate that the No. 3 Pocahontas Coal maintains in Wyoming the excellent reputation as to quality that the seam obtained in the older developed field of McDowell County.

The three following exposures were examined by the writer:

Coal Opening—No. 829 on Map II.

On north hillside of Guyandot River, 0.3 mile west of Mullens;
No. 3 Pocahontas Coal, elevation, 1525' B.

		Ft.	In.
Sandstone, great cliff.....		60	0
Concealed.....		10	0
Coal blossom, No. 3 Pocahontas "Rider".....		0	0
Shale.....		5	0
Coal, soft.....1'	0 "		
Coal, gray, hard.....0	1½		
Coal, soft.....0	4½		
Bone, sulphurous.....0	2		
Coal, soft, columnar (to slate floor).....2	7	4	3

Coal Exposure—No. 830 on Map II.

In Virginian Railway cut, 1.3 miles north of Mullens, and 0.4 mile due north of mouth of Terry Branch; No. 3 Pocahontas Coal; elevation, 1580' B.

	Ft.	In.
Fire clay.....	6	0
Coal.....	3	8
Sandstone, massive.....	15	0

Coal Exposure—No. 831 on Map II.

At south portal of Virginian Railway tunnel, opposite mouth of Cedar Creek of Slab Fork; No. 3 Pocahontas Coal; elevation 1575' B.

		Ft.	In.
Sandstone, massive.....		5	0
Coal, soft.....0'	10"		
Bone, 1" to.....0	2		
Coal, soft.....0	5		
Bone.....0	1		
Coal, soft (to fire clay shale).2	3	3	9

The six following exposures in Slab Fork District were examined by Gawthrop:

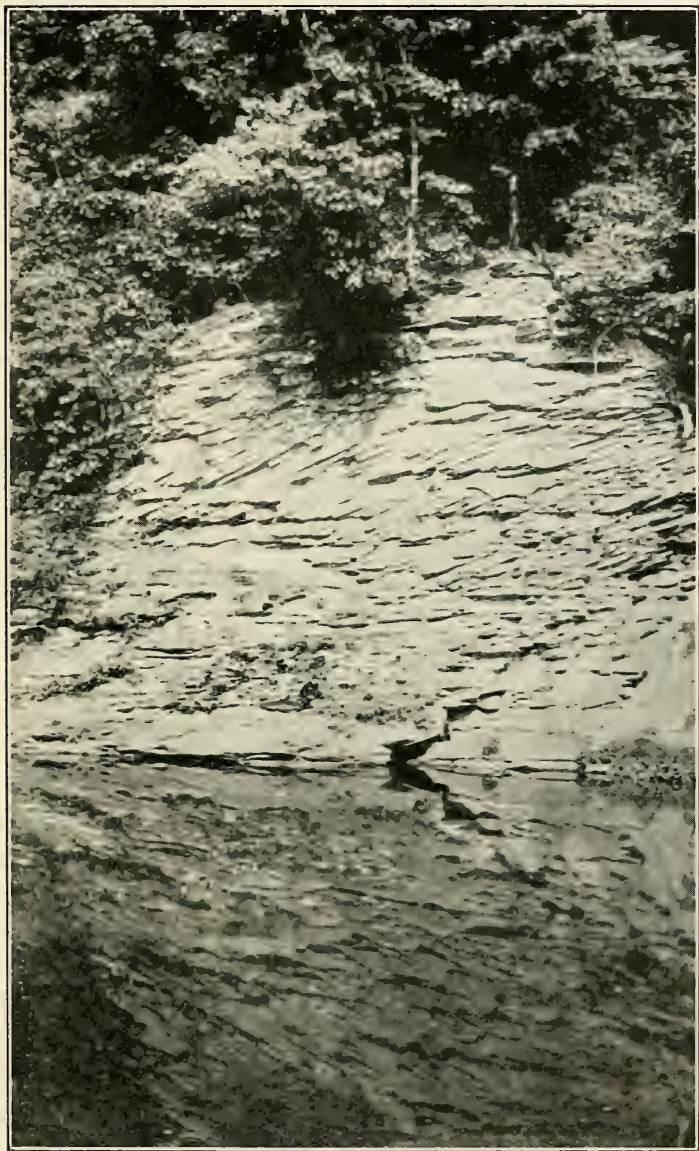


PLATE XXX—Showing current-bedding in Upper Raleigh Sandstone on west bank of Dry Fork, 0.1 mile southwest of Avondale, typical of the ledges in the New River and Pocahontas Groups.

Coal Opening—No. 832 on Map II.

In Virginian Railway cut on north side of Guyandot River, 0.9 mile southeast of Mullens; **No. 3 Pocahontas Coal**; elevation, 1495' B.

			Ft.	In.
Sandstone, shaly, visible.....			5	0
Coal, soft, columnar.....	0'	10"		
Coal, hard.....	0	2		
Bone and slate.....	0	6		
Coal, gray, hard.....	0	3		
Coal, soft columnar.....	2	8	4	5
Shale and concealed.....				

Coal Opening—No. 833 on Map II.

On north side of Guyandot River in point, 1.4 miles southeast of Mullens; **No. 3 Pocahontas Coal**; elevation, 1500' B.

			Ft.	In.
Shale, brownish gray, silicious.....			5	0
Coal, soft, columnar.....	0'	8½"		
Coal, harder, blocky.....	0	2½		
Bone.....	0	3		
Coal, medium soft.....	0	3		
Coal, soft, columnar.....	2	6	3	11
Shale and concealed.....				

Coal Opening—No. 834 on Map II.

On east hillside, ¼ mile up Allen Creek, 1.8 miles northeast of Mullens; **No. 3 Pocahontas Coal**; elevation, 1540' B.

			Ft.	In.
Sandstone, shaly, visible.....			5	0
Coal, soft, columnar.....	0'	6"		
Bone.....	0	2		
Coal, soft, columnar.....	2	6		
Coal, harder.....	0	8	3	10
Shale and concealed.....				

Coal Opening—No. 835 on Map II.

On east bank of Allen Creek, 0.2 mile northwest of Mine No. 99; **No. 3 Pocahontas Coal**; elevation, 1555' B.

			Ft.	In.
Sandstone.....				
Shale, gray, silicious.....			2	0
Slate, black.....	0'	4 "		
Coal, soft, columnar.....	0	11		
Bone.....	0	1½		
Coal, visible.....	2	0½	3	5

Coal Exposure—No. 836 on Map II.

In Virginian Railway cut, north bank of Guyandot River, 0.5 mile southwest of mouth of Devils Fork; No. 3 Pocahontas Coal; elevation, 1560' B.

			Ft.	In.
Sandstone, massive.....			15	0
Coal, soft, columnar.....	0'	8 "		
Bone.....	0	1		
Coal, harder.....	0	3		
Coal, soft, columnar.....	2	3		
Bone.....	0	1½		
Coal, harder (to fire clay shale).....	0	4½	3	9

Coal Exposure—No. 837 on Map II.

On Wyoming-Raleigh County Line, on north bank of Guyandot River; No. 3 Pocahontas Coal; elevation, 1580' B.

			Ft.	In.
Sandstone, massive.....			20	0
Coal, slaty.....	0'	3"		
Coal, soft.....	0	8		
Bone.....	0	2		
Coal, soft.....	2	0		
Bone.....	0	2		
Coal.....	0	4	3	7
Concealed to creek.....			20	0

Barkers Ridge District, Wyoming County.

In Barkers Ridge, the No. 3 Pocahontas Coal attains a fine development, although it is not mined commercially. It has been opened at country banks by natives for domestic fuel and prospected extensively by the large land-holding companies. Its thickness and stratigraphic position are exhibited in the general sections published in Chapter IV for Little Whiteoak Creek, Mullens, Herndon, Mouth of Whiteoak Branch, Bailey Chapel and Clarks Gap, and in the logs of Coal Test Borings Nos. 24, 25 and 25A on Map II. the details of which are given on preceding pages of this Chapter, and partially in the table of borings for Wyoming County, page 268. As shown in the table of available coal on a subsequent page, this bed should produce a large tonnage in the District. The two following prospects were examined by Gawthrop:

Coal Prospect—No. 838 on Map II.

On north bank of Pinnacle Creek, 0.9 mile eastward from mouth of Little Whiteoak Creek; **No. 3 Pocahontas Coal**; elevation, 1450' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Coal, soft, columnar.....	2' 6"		
Bone.....	0 4		
Coal, soft, columnar.....	3 0	5	10
<hr/>			
Shale and concealed to Pinnacle Creek.....		12	0

Coal Prospect—No. 839 on Map II.

On north bank of Pinnacle Creek, $\frac{3}{4}$ mile southeast of Prospect No. 838 above; **No. 3 Pocahontas Coal**; elevation, 1450' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Coal, columnar.....	2' 0"		
Coal, gray.....	0 2		
Coal, soft, columnar.....	0 7		
Bone.....	0 2		
Coal.....	0 4		
Bone.....	0 3		
Coal, soft, columnar.....	2 6	6	0
<hr/>			
Shale and concealed to Pinnacle Creek.....		7	0

The four following exposures in Barkers Ridge District were examined by the writer:

Coal Prospect—No. 840 on Map II.

On south hillside of Guyandot River, $\frac{3}{4}$ mile southeast of mouth of Cabin Creek; **No. 3 Pocahontas Coal**; elevation, 1455' B.

		Ft.	In.
Shale, buff, visible.....		2	0
Coal, soft, columnar.....	1' 0 "		
Shale, gray, dark.....	0 1		
Coal, soft, columnar.....	1 6		
Shale, gray, dark.....	0 0 $\frac{1}{2}$		
Coal, soft, columnar (to slate floor).....	1 11 $\frac{1}{2}$	4	7

Coal Exposure—No. 841 on Map II.

On west bank, 0.8 mile southeast of mouth of Barkers Creek, and 1.1 miles south of Elmore; **No. 3 Pocahontas Coal**; elevation, 1455' B.

		Ft.	In.
Shale, dark, visible.....		2	6
Coal, soft.....	1' 6½"		
Bone.....	0 1½		
Coal.....	2 10	4	6
<hr/>			
Slate, sandstone and concealed to creek.....		15	0

The thickness of the No. 3 Pocahontas bed at **Coal Exposure No. 842 on Map II**, 0.5 mile northeast of Elmore, is shown in the Elmore Section, page 235, under the description of the No. 1 Pocahontas Coal in Chapter VII.

At **Coal Prospect No. 843 on Map II**, in the No. 3 Pocahontas Coal, the thickness and stratigraphic position of the bed are shown in the Mullens Section, in Chapter IV, page 79.

The four following openings in the same District were examined by Gawthrop:

Coal Opening—No. 844 on Map II.

On southwest bank of Guyandot River, 2 miles east of Mullens; **No. 3 Pocahontas Coal**; elevation, 1520' B.

		Ft.	In.
Sandstone, massive, visible.....		5	0
Shale.....		0	4
Coal.....	0' 3"		
Coal, soft, columnar.....	0 8		
Bone.....	0 3		
Coal, medium soft, columnar.....	2 10	4	0
<hr/>			
Shale and concealed.....			

Coal Opening—No. 845 on Map II.

On west bank, 0.3 mile up Big Branch of Guyandot River, 2.8 miles southeast of Mullens; **No. 3 Pocahontas Coal**; elevation, 1560' B.

		Ft.	In.
Sandstone, massive, hard, gray.....		10	0
Shale, with coal streaks.....	0' 6 "		
Coal, soft, columnar.....	0 10½		
Bone.....	0 1½		
Coal, medium soft, columnar (to shale floor).....	2 5	3	11

Coal Opening—No. 846 on Map II.

One and three-tenths miles southeast of Basin; **No. 3 Pocahontas Coal**; elevation, 2500' B.

			Ft.	In.
Shale, dark, flaggy, silicious, visible.....			5	0
Coal, left for roof.....1'	0"			
Bone.....0	2			
Coal, cannel.....3	2			
Coal, soft, columnar.....0	7	.....	4	11
<hr/>				
Shale and concealed.....				

Coal Exposure—No. 847 on Map II.

On head of Barkers Creek, 0.1 mile southwest of Opening No. 846 last described; **No. 3 Pocahontas Coal**; elevation, 2495' B.

			Ft.	In.
Sandstone, visible.....			5	0
Coal, soft, columnar.....1'	0"			
Bone.....0	2			
Coal, cannel, visible.....2	4			
Coal, concealed by water, re- ported.....1	6	.....	5	0
<hr/>				
Shale.....				

The eight following openings in Barkers Ridge District were examined by the writer:

Coal Prospect—No. 848 on Map II.

On east bank of Barkers Creek, 0.4 mile northwest of Herndon; **No. 3 Pocahontas Coal**; elevation, 1870' B.

			Ft.	In.
Shale, dark, sandy, visible.....			4	0
Coal, soft, columnar.....1'	2"			
Shale, black, sandy, plant fos- sils.....0	6			
Coal, soft, columnar.....2	10	.....	4	6
<hr/>				
Slate to bed of Barkers Creek.....			2	0

Coal Opening—No. 849 on Map II.

On south side of Noseman Branch, 0.4 mile southeast of Herndon; **No. 3 Pocahontas Coal**; elevation, 2040' B.

			Ft.	In.
Shale, dark, sandy, visible.....			3	0
Coal, soft.....1'	1"			
Bone.....0	5			
Coal, soft (to gray shale floor).3	0	.....	4	6
<hr/>				

Coal Opening—No. 850 on Map II.

On head of Gooney Otter Creek, 0.4 mile west of Pilot Knob, and 2.6 miles northeast of Clarks Gap; **No. 3 Pocahontas Coal**; elevation, 2540' B.

			Ft.	In.
Shale, dark, sandy, visible.....			4	0
Coal, soft, columnar.....	1'	0"		
Bone, 4" to.....	0	5		
Coal, soft, columnar (to slate floor).....	3	0	4	5

Coal Prospect—No. 851 on Map II.

On the north bank of Beartown Fork of Pinnacle, 1.2 miles northwest of Micajah; **No. 3 Pocahontas Coal**; elevation, 2150' B.

			Ft.	In.
Concealed and slate.....				
Coal, soft.....	1'	3"		
Slate, black, coaly.....	0	10		
Coal, soft.....	3	0	5	1
Slate and concealed to bed of Beartown Fork....			15	0

Coal Exposure—No. 852 on Map II.

In Virginian Railway cut, 0.4 mile northwest of Micajah; **No. 3 Pocahontas Coal**; elevation, 2255' B.

			Ft.	In.
Shale, sandy.....			10	0
Coal, soft, columnar.....	1'	2"		
Slate, black, 0' 6" to.....	0	10		
Coal, soft (to sandstone floor).....	2	10	4	10

Coal Exposure—No. 853 on Map II.

In Virginian Railway cut at Micajah Station; **No. 3 Pocahontas Coal**; elevation, 2283' L.

			Ft.	In.
Sandstone, massive top, shaly bottom.....			18	0
Shale, dark.....			4	0
Coal, soft, columnar.....	1'	5"		
Slate, black.....	0	7		
Bone.....	0	4		
Coal, soft, columnar (to fire clay shale).....	2	6	4	10

Coal Exposure—No. 854 on Map II.

In Virginian Railway cut, 0.9 mile northwest of Clarks Gap; **No. 3 Pocahontas Coal**; elevation, 2405' B.

	Ft.	In.
Sandstone, shaly, Upper Pocahontas , visible.....	35	0
Coal, soft, No. 3 Pocahontas "Rider"	1	0
Shale.....	5	0
Sandstone, shaly at bottom.....	20	0
Coal, soft.....1' 3"		
Bone.....0 10		
Coal, soft.....1 8		
Slate, gray, 0" to.....0 3		
Coal, soft.....0 8	4	8
<hr/>		
Fire clay shale to railroad grade.....	3	0

Coal Exposure—No. 855 on Map II.

At west portal of railroad tunnel at Clarks Gap; **No. 3 Pocahontas Coal**; elevation, 2506' L.

	Ft.	In.
Sandstone, visible.....	17	0
Coal, No. 3 Pocahontas "Rider"	0	3
Shale, gray, 1" to.....	1	0
Sandstone.....	30	0
Coal, soft.....1' 3"		
Bone, 0' 7" to.....0 10		
Coal, soft (to fire clay shale) .3 2	5	3

In the southeast edge of Barkers Ridge District, the six following openings were examined by Gawthrop:

Coal Prospect—No. 856 on Map II.

On west hillside of Pinnacle Creek, 1.3 miles northeast of Crumpler; **No. 3 Pocahontas Coal**; elevation, 2500' B.

	Ft.	In.
Shale, visible.....	5	0
Coal, medium soft.....1' 0"		
Bone.....0 2		
Coal, medium soft.....2 10		
Bone.....0 1		
Coal, medium soft (to shale floor).....0 7	4	8

Coal Opening—No. 857 on Map II.

In east branch of Pinnacle, 0.4 mile southwest of Bailey Chapel, and 1 mile northwest of Prospect No. 856 above; **No. 3 Pocahontas Coal**; elevation, 2370' B.

			Ft.	In.
Shale, visible.....			5	0
Coal, medium soft.....	1'	1"		
Bone.....	0	2		
Coal, gray.....	0	4		
Coal, medium soft (to shale floor).....	2	8	4	3

The thickness of the No. 3 Pocahontas Coal at **Coal Opening No. 858 on Map II**, 1.6 miles northeast of Crumpler, is shown in the Bailey Chapel Section, page 83, published in Chapter IV.

Coal Opening—No. 859 on Map II.

On an east branch of Pinnacle, 1.1 miles west of Bailey Chapel; **No. 3 Pocahontas Coal**; elevation, 2255' B.

			Ft.	In.
Concealed and shale.....				
Coal, soft, No. 3 Pocahontas "Rider"			1	3
Shale, gray, silicious.....			15	0
Coal, soft, columnar.....	1'	0"		
Bone.....	0	3		
Coal, hard, bony.....	0	4		
Coal, medium soft, columnar (to shale).....	2	7	4	2

Coal Prospect—No. 860 on Map II.

On north bank of same branch, 1.7 miles northwest of Bailey Chapel; **No. 3 Pocahontas Coal**; elevation, 2160' B.

			Ft.	In.
Shale.....				
Coal, columnar.....	1'	1"		
Bone.....	0	4		
Coal, soft, columnar.....	3	3	4	8
Shale and concealed.....				

Coal Prospect—No. 861 on Map II.

On east bank of Pinnacle Creek, 0.8 mile southeast of mouth of Little Pinnacle; **No. 3 Pocahontas Coal**; elevation, 2005' B.

			Ft.	In.
Shale, visible.....			5	0
Coal, soft, columnar.....	1'	0"		
Bone.....	0	3		
Coal, soft, columnar.....	3	6	4	9
<hr/>				
Shale and concealed.....				

Sandy River District, McDowell County.

In Sandy River District, the No. 3 Pocahontas Coal lies entirely below drainage and is not believed to attain minable dimensions and purity. The only source of information as to its thickness and character is the logs of Coal Test Borings Nos. 38 and 39 on Map II, used in connection with the Avondale and Bradshaw Sections, in Chapter IV, pages 95 and 99, respectively, where it is shown to be thin and worthless.

Browns Creek District, McDowell County.

In Browns Creek District, the thickness and stratigraphic position of the No. 3 Pocahontas Coal are exhibited in the Cub Branch—Pando, Welch, and Keystone Sections published in Chapter IV, pages 105, 106 and 107, respectively, and in the logs of Coal Test Borings Nos. 44-64, inclusive, on Map II, the details of which are given on preceding pages of this Chapter. The depths and thicknesses may be observed at a glance in the table of borings for McDowell County, pages 290-3. These constitute the authority for the minable area as limited on Figure 28. It is mined commercially along Elkhorn Creek and on Tug Fork, 2 miles northwest of Welch.

The table below gives not only the names and locations of 9 commercial mines in the No. 3 Pocahontas Coal in Browns Creek District that had been sampled previous to 1914, but also page references to their description as published in other Reports. Their composition is republished under their corresponding mine numbers on Map II in the tables of coal analyses at the end of this Chapter:

Mine No. on Map II	Elevation Above Sea Level	Name of Company.	Location.	W.V. Survey Bulletin 2—References to Descrip'n
103	1535B	Tidewater C. & C. Co. No. 3.....	Vivian	p. 216, No.61
104	1575B	Bottom Creek C. & C. Co.....	Vivian, 0.4 mi. E.	p. 216, No.53
105	1620B	Peerless C. & C. Co.	East Vivian	p. 215, No.29
106	1660B	Empire C. & C. Co.	E. Vivian, 0.5 mi. S.E.	p. 214, No.14
107	1745B	Shawnee C. & C. Co.	Eckman, 0.3 mi. W.	p. 215, No.35
108	1810B	Pulaski Iron Co. No. 1.....	Eckman, 0.3 mi. S.E.	p. 215, No.33
109	1805B	Eureka C. & C. Co.	Eckman, 0.7 mi. S.W.	p. 214, No.15
110	1765B	Keystone C. & C. Co. No. 1.....	Keystone, 0.4 mi. N.W.	p. 216, No.50
161	1300B	King C. & C. Co....	West Vivian Sta., 0.3 mi. N.W.	p. 216, No.55

The three following commercial mines in Browns Creek District were visited and sampled by Gawthrop during 1914:

Lake Superior Coal Co. No. 1—No. 100 on Map II.

Browns Creek District; 0.5 mile southeast of Olmsted; No. 3 Pocahontas Coal.

		Ft.	In.
1.	Unrecorded and shale from top of shaft.....	240	0
2.	Coal, soft	0	2
3.	Fire clay shale, 2' 0" to.....	1	6
4.	Coal, medium soft.....0' 8"		
5.	Coal, streaked with mother coal.....0 3		
6.	Coal, medium soft, columnar.....0 11		
7.	Bone.....0 3		
8.	Coal, medium soft.....0 8		
9.	Coal, gas.....0 2		
10.	Coal, medium soft.....1 8		
11.	Coal, very soft, columnar..1 5	6	0
12.	Shale and concealed.....		

"Tidal elevation, 1130' L.; coal owned by Pocahontas Coal & Coke Co.; principal office, Cannelton; daily capacity, 1000 tons; daily output, 600 tons; 25 laborers and 56 miners employed; electric haulage; used for by-product ovens and steam; shipped to Sault St. Marie, Canada, during lake season; butts, N. 35° W.; faces, N. 55° E.; greatest rise, southeast; sample collected from Nos. 4, 5, 6, 8, 9, 10 and 11 of section at face of Main South Entry by R. M. Gawthrop; J. A. Straughan, Superintendent, authority for data."

The composition of the sample from the above mine is published under No. 100 in the table of coal analyses at the end of this Chapter.

Kimball Pocahontas Coal Co.—No. 101 on Map II.Browns Creek District; at Big Four; **No. 3 Pocahontas Coal.**

		Ft.	In.
1. Shale.....			
2. Coal.....		0	3
3. Fire clay shale, 2' 0" to.....		1	0
4. Coal, medium soft.....	1' 11"		
5. Bone.....	0	3	
6. Coal, medium soft, columnar.....	0	8	
7. Coal, gray.....	0	2	
8. Coal, medium soft.....	1	6	
9. Coal, soft, columnar.....	1	0	5 6
10. Shale and concealed.....			

"Tidal elevation, 1350' B.; coal owned by Sam Day; principal office, Bramwell; daily capacity, 300 tons; daily output, 250 tons; 25 laborers and 35 miners employed; mule haulage; used mostly for steam; shipped East to Lamberts Point; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 4, 6, 7, 8 and 9 of section in Room No. 18 off Main Entry by R. M. Gawthrop; G. L. Smith, Foreman, authority for data."

The composition of the sample from the above mine is published under No. 101 in the table of coal analyses at the end of this Chapter:

Houston Coal & Coke Co. No. 2 (Shaft)—No. 102 on Map II.Browns Creek District; 1.0 mile north of Kimball; **No. 3 Pocahontas Coal.**

		Ft.	In.
1. Unrecorded and shale.....			
2. Coal.....	0' 3"		
3. Fire clay shale.....	0	9	
4. Coal, medium soft, columnar.....	0	11	
5. Coal, streaked with mother coal.....	0	3	
6. Coal, medium soft.....	0	10	
7. Bone.....	0	3	
8. Coal, soft, columnar.....	0	8	
9. Coal, gray.....	0	2	
10. Coal, soft, columnar.....	2	0	6 1
11. Shale and concealed.....			

"Tidal elevation, 1355' B.; coal owned by Flat Top Land Co.; principal office, Cincinnati, Ohio; daily capacity, 150 tons; daily output, 150 tons; 12 laborers and 30 miners employed; mule haulage, motors are being installed; used for steam; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 4, 5, 6, 8, 9 and 10 of section at face of No. 3 Main Heading, 600 feet from Shaft, by R. M. Gawthrop; William Prentice, Foreman, authority for data. Mine opened for shipment, May, 1914; data given for both No. 3 and No. 4 Pocahontas seams."

The composition of the sample from the above mine is published under **No. 102** in the table of coal analyses at the end of this Chapter.

The two following commercial mines were examined by Gawthrop:

Standard Pocahontas Coal Co. (Standard Shaft)—No. 159 on Map II.

Browns Creek District; at Farm; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Shale, bluish gray.....			
2.	Coal, soft, columnar.....	0'	4"	
3.	Sulphur, 0¼" to.....	0	0	
4.	Coal, soft, columnar.....	0	10½	
5.	Coal, gray.....	0	1	
6.	Coal, soft, columnar.....	0	6	
7.	Bone.....	0	4	
8.	Coal, soft, columnar.....	0	9	
9.	Coal, gray.....	0	2½	
10.	Coal, soft, columnar.....	2	4	5 5
11.	Shale and concealed.....			

"Tidal elevation, 924' L.; coal owned by Standard Pocahontas Coal Co.; principal office, Cleveland, Ohio; daily capacity, 600 tons; daily output, 300 tons; 77 laborers and 52 miners employed; mule and electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 35° W.; faces N. 55° E.; greatest rise, southeast; J. M. Harman, Superintendent, authority for data."

The composition of a sample of coal from the above mine, as published in Bulletin 85 of the U. S. Bureau of Mines, page 120, is republished in the second table of analyses at the end of this Chapter under **No. 159**.

**Pocahontas Consolidated Collieries Co. (Cirrus No. 2).
No. 160 on Map II.**

Browns Creek District; 0.3 mile west of Big Four; **No. 3 Pocahontas Coal.**

		Ft.	In.
1.	Shale.....		
2.	Coal, soft.....	0	3
3.	Fire clay shale, 1' 6" to.....	1	0
4.	Coal, medium soft.....	0'	4"
5.	Sulphur, 0¼" to.....	0	0
6.	Coal, medium soft.....	0	6
7.	Coal, gray, hard.....	0	2
8.	Coal, medium soft, columnar.....	1	0
9.	Bone.....	0	3

			Ft.	In
10. Coal, soft, columnar.....	0'	8"		
11. Coal, gray.....	0	2		
12. Coal, medium soft, columnar.....	2	9	5	10
13. Shale and concealed.....				

"Tidal elevation, 1310' B.; coal owned by Flat Top Land Co.; principal office, Pocahontas, Va.; daily capacity, 400 tons; daily output, 350 tons; 20 laborers and 30 miners employed; mule and electric haulage; used for steam; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; J. L. Kipfinger, Foreman, authority for data."

The composition of a sample of coal from the above mine, as published in Bulletin 85 of the U. S. Bureau of Mines, page 115, is republished in the second table of analyses at the end of this Chapter under **No. 160.**

Big Creek District, McDowell County.

In Big Creek District, the thickness and stratigraphic position of the No. 3 Pocahontas Coal are exhibited in the Coalwood, Jacob Fork, Long Branch, Berwind, Head of Vall Creek, Bearwallow Knob and Horsepen Creek Sections, published in Chapter IV, and in the logs of Coal Test Borings Nos. 65-133, inclusive, on Map II, the details of which are given on preceding pages of this Chapter. The depths and thicknesses of the seam may be seen at a glance in the table of borings for McDowell County, pages 290-3. These bore hole records constitute the authority for the location of the west boundary line of this coal as indicated on Figure 28. The six following openings on the waters of Big Creek were examined by Gawthrop:

Coal Opening—No. 862 on Map II.

On north bank of Jacob Fork, $\frac{1}{4}$ mile northwest of mouth of Upper Trace Fork, and 2.4 miles northeast of Berwind; **No. 3 Pocahontas Coal**; elevation, 1535' B.

		Ft.	In.
Shale, gray, visible.....		5	0
Coal, No. 3 Pocahontas "Rider".....		0	2
Shale, gray, silicious.....		5	0
Draw slate and shale.....		1	0
Coal, soft, columnar.....	0' 11 $\frac{1}{2}$ "		
Coal, harder.....	0 4 $\frac{1}{2}$		
Coal, soft, columnar.....	1 1		

			Ft.	In.
Coal, harder.....	0'	5"		
Coal, soft, columnar.....	1	6		
Bone.....	0	1		
Coal, medium soft.....	0	11		
Slate.....	0	1		
Coal, medium soft.....	0	3	5	8
<hr/>				
Shale and concealed to run.....			20	0

Coal Opening—No. 863 on Map II.

On north bank, 0.1 mile up Upper Trace Fork of Jacob Fork, 2.7 miles northeast of Berwind; **No. 3 Pocahontas Coal**; elevation, 1595' B.

			Ft.	In.
Shale, gray, silicious, visible.....			8	0
Coal.....			0	3
Shale, bluish gray.....			4	0
Coal, soft, columnar.....	1'	0"		
Coal, harder.....	0	5		
Coal, soft, columnar.....	1	3		
Coal, harder.....	0	6		
Coal, concealed by water.....	0	10		
Bone, reported.....	0	4		
Coal, reported (to shale floor).....	1	8	6	0

Coal Opening—No. 864 on Map II.

One-half mile due west of Cucumber and 3 miles eastward from Berwind; **No. 3 Pocahontas Coal**; elevation, 1775' B.

			Ft.	In.
Coal, No. 3 Pocahontas "Rider"			0	2
Shale, bluish gray.....			7	0
Fire clay shale.....			1	0
Coal, left for roof.....	1'	1"		
Coal, hard, blocky.....	0	6		
Coal, soft, columnar.....	2	9		
Bone.....	0	4		
Coal, gray.....	0	5		
Coal, medium soft.....	0	5		
Coal, bony.....	0	3		
Coal, medium soft.....	0	8	6	5
<hr/>				
Shale and concealed.....				

Coal Opening—No. 865 on Map II.

Four-tenths mile due north of Cucumber and 3.6 miles due east of Berwind; **No. 3 Pocahontas Coal**; elevation, 1850' B.

			Ft.	In.
Shale, visible.....			3	0
Coal, left for roof.....	1'	8"		
Coal, soft, columnar.....	2	6		

			Ft.	In.
Bone.....	0'	2½"		
Coal, medium soft.....	0	4		
Coal, soft, columnar.....	0	11½	5	8
<hr/>				
Shale and concealed.....				

Coal Opening—No. 866 on Map II.

In run on west hillside of Big Creek, 0.8 mile northward from Opening No. 865 above; **No. 3 Pocahontas Coal**; elevation, 1790' B.

			Ft.	In.
Shale, dark, silicious, visible.....			5	0
Coal, medium soft, columnar.....	2'	0"		
Coal, harder.....	0	4		
Coal, soft, columnar.....	0	6		
Coal, harder.....	0	5		
Coal, soft, columnar.....	0	9		
Bone.....	0	3		
Coal, medium soft.....	1	1	5	4

Shale and concealed.....

Coal Prospect—No. 867 on Map II.

On ridge, head of Open Fork, 2.1 miles north of Squirejim; **No. 3 Pocahontas Coal**; elevation, 2472' L.

Coal, 6' 7"; slate, 0' 2", as reported by U. S. Coal & Coke Co.

The thickness and elevation of the coal at the four following prospects are on the authority of the U. S. Coal & Coke Co. at Gary:

Coal Prospect—No. 868 on Map II.

On east side of Long Branch, 1.2 miles southwest of Filbert, and 1.4 miles northwest of mouth of Spice Fork; **No. 3 Pocahontas Coal**; elevation, 1819' L.

Coal, 4' 8", with 0' 2" of slate.

Coal Prospect—No. 869 on Map II.

On northwest hillside, 0.8 mile up Spice Fork of Long Branch, 1.3 miles southeast of Filbert; **No. 3 Pocahontas Coal**; elevation, 2237' L.

Coal, 4' 8", with 2" of slate.

Coal Prospect—No. 870 on Map II.

On head of Long Branch, 2.6 miles northeast of Squirejim; **No. 3 Pocahontas Coal**; elevation, 2441' L.

Coal, 5' 1", with 2" of slate.

Coal Prospect—No. 871 on Map II.

On south hillside of North Fork of Big Creek, 2 miles northeast of Squirejim; **No. 3 Pocahontas Coal**; elevation, 2175' L.

Coal, 8' 3", with 2" of slate.

The eight following openings in Big Creek District were examined by Gawthrop:

Coal Opening—No. 872 on Map II.

On south hillside of North Fork, 1 mile northeast of Squirejim; **No. 3 Pocahontas Coal**; elevation, 2175' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Coal, soft, left for roof.....	0' 11"		
Coal, soft, columnar.....	2	0	
Coal, harder.....	0	4	
Coal, soft, columnar.....	0	4	
Coal, gray.....	0	2	
Coal, soft.....	0	5	
Coal, bony.....	0	3	
Bone.....	0	4	
Coal, medium soft.....	0	9	5
Shale and concealed.....			6

Coal Opening—No. 873 on Map II.

On south hillside of North Fork, 0.4 mile west of Opening No. 872 above; **No. 3 Pocahontas Coal**; elevation, 2254' L.

		Ft.	In.
Shale, gray, visible.....		6	0
Coal, soft, columnar.....	2' 8"		
Coal, harder.....	0	4	
Coal, soft, columnar.....	2	3	
Bone.....	0	3	
Coal, medium soft.....	0	8½	
Bone.....	0	1½	
Coal, medium soft.....	0	9	
Coal, concealed by water (to slate).....	0	9	7
			10

Coal Opening—No. 874 on Map II.

On south hillside of Middle Fork, ¾ mile southeast of Squirejim; **No. 3 Pocahontas Coal**; elevation, 1995' B.

	Ft.	In.
Shale, bluish gray, silicious, visible.....	10	0
Coal.....	0	1
Fire clay shale.....	1	0

		Ft.	In.
Coal, soft, columnar.....	1' 5"		
Coal, harder.....	0 4		
Coal, soft, columnar.....	0 8		
Coal, harder.....	0 4		
Coal, soft, columnar.....	2 0		
Bone.....	0 4		
Coal, medium soft.....	0 10	5	11

Coal Opening—No. 875 on Map II.

On east side of Road Fork and road, 0.6 mile south of Squirejim;

No. 3 Pocahontas Coal; elevation, 1970' B.

		Ft.	In.
Shale, buff, silicious, visible.....		8	0
Coal, medium soft.....	0' 8"		
Coal, soft, columnar.....	2 4		
Coal, harder.....	0 5		
Coal, soft, columnar.....	0 4		
Coal, harder.....	0 3		
Coal, soft, columnar.....	0 7		
Bone coal.....	0 5		
Coal, medium soft.....	0 4	5	4

Shale and concealed.....

Coal Opening—No. 876 on Map II.

On south hillside of Jacob Fork, 1.6 miles southeast of Squire;

No. 3 Pocahontas Coal; elevation, 1825' B.

		Ft.	In.
Sandstone, sha'y, visible.....		3	0
Coal, soft, columnar.....	1' 7"		
Coal, harder.....	0 4		
Coal, soft, columnar.....	0 6		
Coal, medium soft.....	0 10		
Bone.....	0 5		
Coal, slaty.....	0 6		
Coal (to shale and concealed).0	10	5	0

Coal Opening—No. 877 on Map II.

In run on west side of Jacob Fork, 0.5 mile southeast of Opening

No. 876 above; No. 3 Pocahontas Coal; elevation, 1800' B.

		Ft.	In.
Shale, bluish gray, visible.....		8	0
Coal, soft, columnar.....	1' 8"		
Coal, harder.....	0 5		
Coal, slaty.....	0 5		
Bone, 0" to.....	0 1		
Coal, medium soft.....	1 5	4	0

Slate and concealed.....

Coal Opening—No. 878 on Map II.

On west side of branch of Jacob Fork, 1.5 miles southward from Squire; No. 3 Pocahontas Coal; elevation, 1990' B.

		Ft.	In.
Sandstone, bluish gray.....		3	0
Coal, medium soft, columnar.....	0' 6"		
Coal, gray, harder.....	0 2		
Coal, soft.....	0 8		
Coal, gray.....	0 3		
Coal, soft, columnar.....	1 8		
Bone.....	0 3		
Coal, soft.....	0 3		
Coal, slaty.....	0 3		
Coal, medium soft (to shale floor).....	0 8	4	8

Coal Prospect—No. 879 on Map II.

On north side of branch of Dry Fork, 0.8 mile southeast of Beech Fork P. O.; No. 3 Pocahontas Coal; elevation, 2045' B.

		Ft.	In.
Shale, dark.....		2	0
Fire clay shale, dark.....		1	0
Coal, soft.....	3' 3"		
Shale, gray.....	0 2		
Coal, slaty (to slate floor).....	0 3	3	8

The two following commercial mines in Big Creek District on the No. 3 Pocahontas Coal were sampled by the writer previous to 1914 and their descriptions published on the pages designated of Volume II(A) of the State Geological Survey Reports. The analyses are republished under the corresponding mine number on Map II in the first table of coal analyses at the end of this Chapter:

Mine No. on Map II	Elevation Above Sea Level	Name of Company.	Location.	Page Reference to Vol. II(A)
111	1575	New River & Poca. Con. C. & C. Co. No. 1	Berwind, 1 mi. S.E.	154
112	1580	New River & Poca. Con. C. & C. Co. No. 3	Canebrake, 0.2 mi. W.	154

The two following commercial mines in Big Creek District were visited and sampled by Gawthrop during 1914, but the analytical results were determined of mine No. 113 only, for reasons mentioned on preceding pages:

New River & Poca. Con. C. & C. Co. No. 4—No. 113 on Map II.

Big Creek District; 0.8 mile north of Hartwell; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Concealed.....			
2.	Shale, gray, silicious.....		7	0
3.	Coal, soft.....	0' 4"		
4.	Sulphur, 0¼" to.....	0 0		
5.	Coal, medium soft, columnar.....	2 9		
6.	Bone.....	0 2		
7.	Coal, medium soft, columnar.....	1 0	4	3
8.	Shale and concealed.....			

"Tidal elevation, 1800' B.; coal owned by New River and Pocahontas Consolidated Coal & Coke Co.; principal office, Philadelphia, Pa.; daily capacity, 500 tons; daily output, 400 tons; 25 laborers and 60 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West, mostly West; butts and faces, irregular; greatest rise, S. 35° E., by pocket compass; sample collected from Nos. 3, 5 and 7 of section in Room No. 5 off 5th Left Entry by R. M. Gawthrop; J. M. Pitman, Foreman, authority for data. Coal varies from 3' 6" to 5' 4"; averages about 4' 3"."

The composition of the sample from the above mine is published under No. 113 in the table of coal analyses at the end of this Chapter:

New River & Poca. Con. C. & C. No. 5—No. 114 on Map II.

Big Creek District; 0.8 mile west of Hartwell; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Concealed.....			
2.	Shale, gray, silicious.....		5	0
3.	Coal, medium soft, columnar.....	2' 5"		
4.	Bone.....	0 2		
5.	Coal, soft, columnar.....	1 5	4	0
6.	Shale and concealed.....			

"Tidal elevation 1770' B.; coal owned by New River and Pocahontas Consolidated Coal & Coke Co.; principal office, Philadelphia, Pa.; daily capacity, 500 tons; daily output, 450 tons; 22 laborers and 46 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; butts, N. 40° W.; faces, N. 50° E.; greatest rise, southeast; sample collected from Nos. 3 and 5 of section at face of 2nd Left Air Course by R. M. Gawthrop; Frank Sizeman, Assistant Foreman, authority for data. Coal varies from 3' 0" to 5' 0"."

Adkin District, McDowell County.

In Adkin District, the thickness and stratigraphic position of the No. 3 Pocahontas Coal are exhibited in the Spice Creek Section (at Coal Prospect No. 890A on Map II), published in Chapter IV, page 123, and in the logs of Coal Test Borings Nos. 133-173, inclusive, on Map II, the details of which are given on preceding pages of this Chapter. Its depth and thickness at these borings may be seen at a glance in the table of bore hole records for McDowell County, pages 290-3. It appears to attain minable dimensions and purity throughout the region of its occurrence as shown for this District on Figure 28, and it has been operated quite extensively on a commercial scale.

The nine following commercial mines in Adkin District on the No. 3 Pocahontas Coal were sampled mostly by the writer, previous to 1914, and their descriptions published on the pages of the Reports designated. The results are republished under the corresponding mine number on Map II in the tables of coal analyses at the end of this Chapter:

Mine No. on Map II	Elevation Above Sea Level	Name of Company.	Location.	Other Survey Reports—References to Descriptions.
115	1100B	New River & Poca. Con. C. & C. Co. (Jed.) . . .	Havaco (Jed)	Vol.II(A),p.151
116	1266L	U. S. C. & C. Co. No. 1	Wilcoe, 0.4 mi. N.E.	Vol.II(A),p.151
117	1609L	U. S. C. & C. Co. No. 11	Gary, 1.5 mi. E.	Vol.II(A),p.152
119	1719L	U. S. C. & C. Co. No. 4	Thorpe, 0.9 mi. N.E.	Vol.II(A),p.152
120	1786L	U. S. C. & C. So. No. 5	Thorpe, 1.1 mi. S.E.	Vol.II(A),p.152
121	1875B	Page C. & C. Co. No. 1	Pageton Sta., 1 mi. N.W.	Vol.II(A),p.153
163	1910B	Page C. & C. Co. No. 2	Pageton Sta., 0.4 mi. W.	Bull. 2, p. 214, No. 27.
164	1900B	Page C. & C. Co. No. 3	Pageton Sta., 1.3 mi. N.	Bull. 12, p. 214, No. 28.
167	2229B	W. Va. Poca. C. Co. No. 2	Leckie Sta., 0.3 mi. N.E.	U. S. Bull. 85, p. 117.

The two following commercial mines in the same District were examined and sampled by Gawthrop, and the proximate analyses of the samples were determined:

U. S. Coal & Coke Co. No. 10—No. 118 on Map II.

Adkin District, 0.5 mile northwest of Thorpe; No. 3 Pocahontas Coal.

		Ft.	In.
1.	Concealed.....		
2.	Shale, gray.....	10	0
3.	Coal, soft.....	0	3
4.	Fire clay shale, 2' 0" to.....	1	0
5.	Coal, soft, columnar.....0' 5½"		
6.	Sulphur, 0" to.....0 0½		
7.	Coal, soft, columnar.....1 1½		
8.	Sulphur bone, 0" to.....0 0½		
9.	Coal, soft, columnar.....0 5		
10.	Bone.....0 2		
11.	Coal, medium soft, columnar.....0 8		
12.	Coal, gray.....0 2		
13.	Coal, medium hard.....1 6		
14.	Coal, soft, columnar.....1 0	5	7
15.	Shale and concealed.....		

"Sample collected from Nos. 5, 7, 9, 11, 12, 13 and 14 of section at face of Main Heading, 700 feet above 1st Left Heading, by R. M. Gawthrop; H. K. Payne, Assistant Foreman authority for data. Note.—See No. 4 Pocahontas seam of No. 10 Mine for additional data."

The composition of the sample from the above mine is published under No. 118 in the table of coal analyses at the end of this Chapter:

Central Pocahontas Coal Co. No. 2—No. 122 on Map II.

Adkin District, 0.3 mile southwest of O'Toole; No. 3 Pocahontas Coal.

		Ft.	In.
1.	Concealed.....		
2.	Shale, bluish gray.....		
3.	Coal, medium hard.....0' 8"		
4.	Coal, soft, columnar.....1 8		
5.	Coal, gray.....0 4		
6.	Coal, soft.....0 5		
7.	Bone.....0 2		
8.	Coal, soft.....0 8		
9.	Coal, gray.....0 3		
10.	Coal, soft.....0 5		
11.	Bone, 0½" to.....0 0		
12.	Coal, soft, columnar.....1 2	5	9
13.	Shale and concealed.....		

"Tidal elevation, 2470' B.; coal owned by Central Pocahontas Coal Co.; principal office, Gary; daily capacity, 100 tons; daily output, 150 tons; 8 laborers and 14 miners employed; mule haulage; used for steam and domestic fuel; shipped East and West; no butts or faces; greatest rise, west; sample collected from Nos. 3, 4, 5, 6, 8, 9, 10 and 12 of section in Room No. 8 off 1st Right Entry by R. M. Gawthrop; J. S. Money, Foreman, authority for data."

The composition of the sample from the above mine is published under **No. 122** in the table of coal analyses at the end of this Chapter.

The two following commercial mines in the same District were examined by Gawthrop:

Central Pocahontas Coal Co. No. 1—No. 165 on Map II.

Adkin District, 1.0 mile west of Anawalt; **No. 3 Pocahontas Coal.**

		Ft.	In.
1. Concealed and bluish gray shale.....			
2. Coal, high in sulphur, 0" to 0' 4 "	4		
3. Coal, soft, columnar.....0	10		
4. Coal, gray.....0	3		
5. Coal, soft.....0	9½		
6. Bone.....0	3½		
7. Coal, soft.....0	10		
8. Coal, gray.....0	2		
9. Coal, soft, columnar.....3	9	8	3
10. Shale and concealed.....			

"Tidal elevation 2250' B.; coal owned by Central Pocahontas Coal Co.; principal office, Gary; daily capacity, 450 tons; daily output, 300 tons; 8 laborers and 18 miners employed; mule haulage; used for steam and domestic fuel; shipped East and West; no butts or faces; greatest rise, southeast; E. T. Lilly, Foreman, authority for data."

The composition of a sample of coal from the above mine, as published in Bulletin 22 of the U. S. Bureau of Mines, page 248, is republished under **No. 165** in the second table of coal analyses at the end of this Chapter.

West Virginia Pocahontas Coal Co. No. 1—No. 166 on Map II.

Adkin District, 0.5 mile north of Leckie; **No. 3 Pocahontas Coal.**

		Ft.	In.
1. Concealed.....			
2. Shale, gray.....	10	0	
3. Coal, soft, columnar.....0' 10 "	10		
4. Sulphur streak.....0	0½		
5. Coal, soft, columnar.....1	3½		
6. Coal, gray.....0	3		
7. Coal, soft, columnar.....0	4½		
8. Bone.....0	3½		
9. Coal, soft, columnar.....1	4		

			Ft.	In.
10. Coal, gray.....	0'	2 "		
11. Coal, soft, columnar.....	3	5	8	0
12. Shale and concealed.....				

"Tidal elevation, 2200' B.; coal owned by W. Va. Pocahontas Coal Co.; principal office, Welch; daily capacity, 900 tons; daily output, 800 tons; 21 laborers and 42 miners employed; mule and electric haulage; used for steam and domestic fuel; shipped East and West; no butts or faces; greatest rise, southeast; J. W. Bragg, Bookkeeper, authority for data."

The composition of a sample of coal from the above mine, as published in Bulletin 85 of the U. S. Bureau of Mines, page 116, is republished under **No. 166** of the second table of coal analyses at the end of this Chapter.

The following opening was examined by Gawthrop in Adkin District:

Coal Opening—No. 880 on Map II.

On east hillside of Leslie Branch, 1.5 miles northeast of Thorpe;
No. 3 Pocahontas Coal; elevation, 1800' B.

			Ft.	In.
Shale, gray, silicious, visible.....			5	0
Coal, roof.....	0'	6"		
Sulphur band.....	0	2		
Coal, medium soft.....	2	5		
Bone.....	0	2		
Coal, medium soft, columnar.....	3	6		
Coal, concealed by water, re- ported.....	0	6	7	3
Shale.....				

In the same district, the following opening was examined by the writer:

Coal Opening—No. 881 on Map II.

On a north branch of Mill Branch, 2 miles northwest of Leckie;
No. 3 Pocahontas Coal; elevation, 1975' B.

			Ft.	In.
Shale, buff, sandy, visible.....			7	0
Coal, soft.....	2'	10"		
Bone coal.....	0	2		
Coal, soft.....	5	0	8	0

The three following openings on Little Creek were examined by Gawthrop:

Coal Mine—No. 882 on Map II.

On head of Little Creek, 2 miles due west of Coaldale; **No. 3 Pocahontas Coal**; elevation, 2390' B.

			Ft.	In.
Shale, gray, silicious, many plant fossils, visible..			15	0
Coal , medium soft, left for roof..1'	3"			
Sulphur band.....0	1			
Coal , medium soft.....2	2			
Bone.....0	4			
Coal , soft, columnar.....3	0			
Coal , bony.....0	2			
Coal , medium soft, columnar (to shale).....1	10	.....	8	10

Coal Opening—No. 883 on Map II.

On head of Little Creek, 0.4 mile southwest of common corner of McDowell, Mercer and Tazewell Counties; **No. 3 Pocahontas Coal**; elevation, 2425' B.

			Ft.	In.
Shale.....				
Coal , left up.....1'	3"			
Sulphur band.....0	1			
Coal , soft, columnar.....1	11			
Bone coal.....0	3			
Coal , soft, columnar.....2	2			
Coal , gray, harder.....0	2			
Coal , medium soft.....2	2	.....	8	0

Coal Opening—No. 884 on Map II.

On south hillside of Little Creek, 1.5 miles southwest of Opening No. 883 above; **No. 3 Pocahontas Coal**; 2480' B.

			Ft.	In.
Shale, gray, silicious.....				
Coal , medium soft, columnar..1'	6"			
Coal , soft, columnar.....2	6			
Bone.....0	3			
Coal , medium soft, columnar..0	8			
Coal , soft, columnar.....2	4			
Coal , harder (to shale floor)..1	10	.....	9	1

In the southeast border of Adkin District, the three following prospects were examined by Gawthrop:

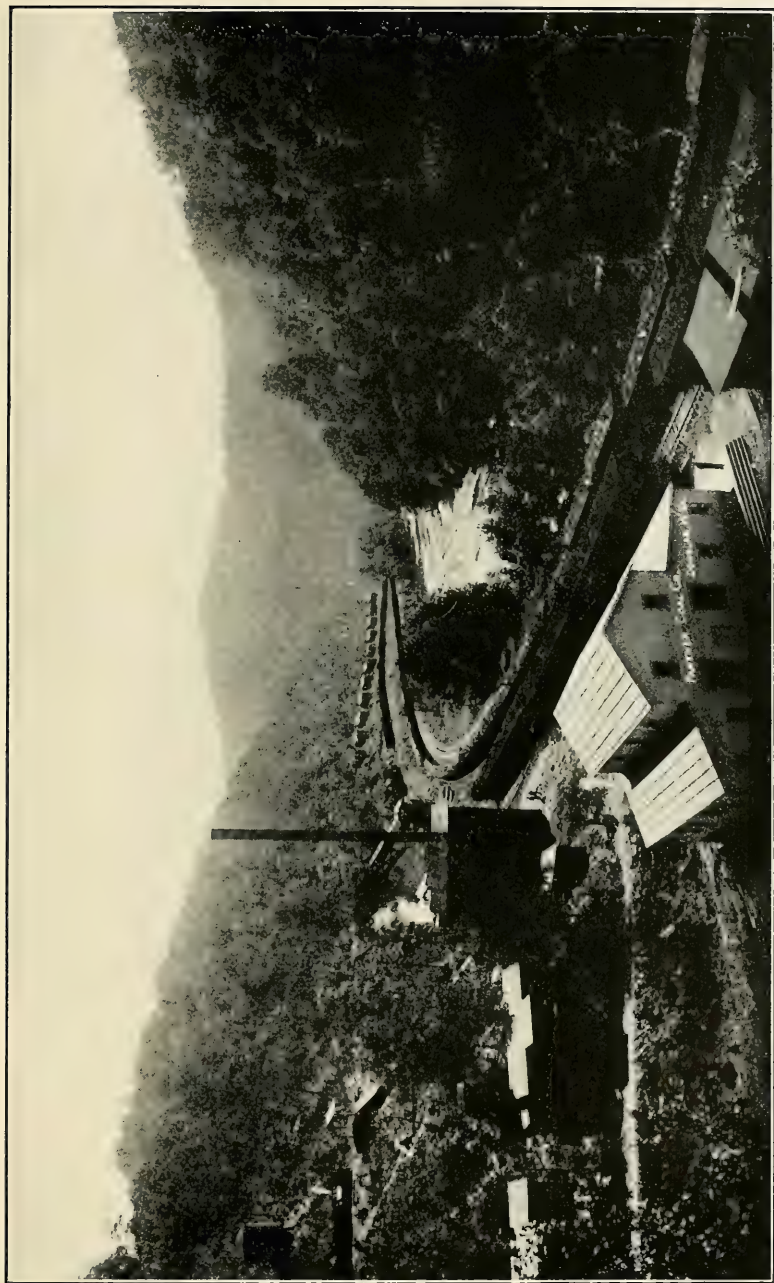


PLATE XXXI—Showing store, power house and tipple at Panther Coal Co., and forests and topography of Kanawha and New River Groups, looking south up Tug Fork from Douglas, McDowell County.
Photo by courtesy of William Leckie of Welch.

Coal Prospect—No. 885 on Map II.

One mile east of mouth of Millseat Branch of Tug Fork, and 1.8 miles southeast of Anawalt; **No. 3 Pocahontas Coal**; elevation, 2445' B.

			Ft.	In.
Shale, gray.....				
Coal, soft.....	2'	6"		
Coal, harder.....	0	3		
Coal, soft.....	2	3		
Coal, bony.....	0	3		
Coal, medium soft, columnar.....	2	6		
Coal, concealed by water (to shale).....	1	0	8	9

Coal Prospect—No. 886 on Map II.

On southeast hillside, 0.7 mile up Sams Branch of Tug, and 0.9 mile north of Jenkinjones; **No. 3 Pocahontas Coal**; elevation, 2330' B.

			Ft.	In.
Shale.....				
Coal, medium soft.....	1'	4"		
Coal, soft, columnar.....	2	6		
Bone.....	0	3		
Coal, medium soft.....	0	7		
Coal, soft, columnar.....	1	10		
Coal, medium hard, columnar (to shale).....	3	2	9	8

Coal Prospect—No. 887 on Map II.

On head of Jump Branch of South Fork, 1.5 miles northwest of Jenkinjones; **No. 3 Pocahontas Coal**; elevation, 2380' B.

			Ft.	In.
Shale.....				
Coal, soft, columnar.....	3'	2"		
Bone.....	0	2		
Coal, soft, columnar.....	1	3		
Coal, gray, harder.....	0	4		
Coal, soft.....	0	7		
Coal, gray, harder.....	0	2		
Coal, medium soft (to shale floor).....	1	6	7	2

In the southeast edge of Adkin District, on the extreme head of Tug Fork, the three following commercial mines were examined and sampled but, for reasons mentioned on a preceding page of this Chapter, the analysis of sample from mine No. 123 only was determined:

Pocahontas Cons. Colliery Co. Drift No. 1 of Mine No. 8—No. 123 on Map II.

Adkin District, 1.2 miles southwest of Jenkinjones; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Concealed.....			
2.	Shale, bluish gray.....		5	0
3.	Coal, medium hard.....	0' 6"		
4.	Coal, soft, columnar.....	2 9		
5.	Bone.....	0 4		
6.	Coal, soft, columnar.....	0 10		
7.	Coal, gray.....	0 4		
8.	Coal, soft, columnar.....	0 10		
9.	Black rash.....	0 2		
10.	Coal, soft, columnar.....	1 0	6	9
11.	Shale and concealed.....			

"Tidal elevation, 2206' L.; coal owned by Flat Top Land Co.; principal office, Pocahontas, Va.; daily capacity, 700 tons; daily output, 700 tons; 60 laborers and 50 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West; no butts or faces; greatest rise, northwest; sample collected from Nos. 3, 4, 6, 7, 8 and 10 of section in Room No. 6 off 2nd Right Heading, by R. M. Gawthrop; R. C. Mitchell, Foreman, authority for data. Note.—Coal varies from 2' 6" to 12' 0", with average of about 6' 6"."

The composition of the sample from the above mine is published under **No. 123** in the table of coal analyses at the end of this Chapter.

Pocahontas Cons. Colliery Co. Drift No. 1 of Mine No. 7—No. 124 on Map II.

Adkin District, 0.7 mile south of Jenkinjones; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Concealed.....			
2.	Shale, bluish gray.....			
3.	Coal, medium hard.....	1' 0"		
4.	Coal, soft, columnar.....	2 4		
5.	Bone, 0" to.....	0 3		
6.	Coal, soft, columnar.....	0 10		
7.	Bone.....	0 2		
8.	Coal, medium soft, columnar.....	3 3		
9.	Coal, soft, columnar.....	2 0		
10.	Black rash.....	0 10	10	8
11.	Shale and concealed.....			

"Tidal elevation, 2137' L.; coal owned by Flat Top Land Co.; principal office, Pocahontas, Va.; daily capacity, 900 tons; daily output, 600 tons; 25 laborers and 70 miners employed; electric haulage; used for steam; shipped East and West, mostly to Lambert Point; no butts or faces; greatest rise, northwest; sample collected from Nos. 3, 4, 6, 8 and 9 of section, at face of Main Air Course, 300 feet above 8th Right Heading, by R. M. Gawthrop; Alford Hall, Foreman, authority for data. Note.—Coal rolls back in this mine; varies from 2' 0" to 14' 0", with average of about 7'."

**Pocahontas Cons. Colliery Co. Drift No. 4 of Mine No. 6—
No. 125 on Map II.**

Adkin District, 0.6 mile southeast of Jenkinjones; **No. 3 Pocahontas Coal.**

			Ft.	In.
1.	Concealed.....			
2.	Shale, bluish gray.....		5	0
3.	Coal, medium soft.....	0' 11"		
4.	Coal, gray.....	0	4	
5.	Coal, soft, columnar.....	2	5	
6.	Bone.....	0	4	
7.	Coal, soft.....	0	4	
8.	Coal, gray.....	0	2	
9.	Coal, medium soft, columnar.....	3	6	
10.	Black rash.....	0	3	
11.	Coal, soft, columnar.....	1	9	10 0
12.	Shale and concealed.....			

"Tidal elevation, 2162' L.; coal owned by Flat Top Land Co.; principal office, Pocahontas, Va.; daily capacity, 1250 tons; daily output, 1000 tons; 35 laborers and 100 miners employed; electric haulage; used for steam and domestic fuel; shipped East and West, mostly East to Lamberts Point; no butts or faces; greatest rise, northwest; sample collected from Nos. 3, 4, 5, 7, 8, 9 and 11 of section at face of 6-F-6 Entry, by R. M. Gawthrop; Alford Hall, Foreman, authority for data. Coal is regular in this mine with thickness of about 10'."

The following opening was examined by Gawthrop:

Coal Opening—No. 888 on Map II.

Edge of hill road, head of Road Fork, 2.6 miles southwest of Jenkinjones; **No. 3 Pocahontas Coal**; elevation, 2175' B.

		Ft.	In.
Shale, gray, silicious, visible.....		5	0
Slate.....	0' 2"		
Coal, medium hard, blocky...	0	5	
Coal, soft, columnar.....	1	5	
Coal, bony.....	0	2	
Coal, hard, gray.....	0	4	
Coal, soft.....	0	5	
Coal, gray.....	0	1	
Coal, soft, columnar.....	0	10	
Bone.....	0	2	
Coal, soft, columnar (to shale).....	1	8	5 8

The thickness and elevation of this coal at the five following prospects are on the authority of the U. S. Coal & Coke Co.:

Coal Prospect—No. 889 on Map II.

On head of South Fork of Tug, 1.4 miles southwest of Opening No. 888 above; **No. 3 Pocahontas Coal**; elevation, 2125' L.

Coal, 5' 6", with 1" of slate.

Coal Prospect—No. 890 on Map II.

On point, $\frac{3}{4}$ mile westward from mouth of Laurel Branch, and 4 miles northeast of Squirejim; **No. 3 Pocahontas Coal**; elevation, 2473' L.

Coal, 5' 0", with 1 $\frac{1}{2}$ " of slate.

Coal Prospect—No. 891 on Map II.

On head of Spice Creek, 1.5 miles southwest of Black Wolf; **No. 3 Pocahontas Coal**; elevation, 2263' L.

Coal, 4' 2", with 2 $\frac{1}{2}$ " of slate.

Coal Prospect—No. 892 on Map II.

On head of Spice Creek, 2 $\frac{3}{4}$ miles southwest of Black Wolf; **No. 3 Pocahontas Coal**; elevation, 2262' L.

Coal, 4' 6", with 2" of slate.

Coal Prospect—No. 893 on Map II.

On head of Laurel Branch, 1.2 miles south of Prospect No. 892 above; **No. 3 Pocahontas Coal**; elevation, 2581' L.

Coal, 4' 3", with 2" of slate.

North Fork District, McDowell County.

In North Fork District, the No. 3 Pocahontas Coal attains minable dimensions throughout the region of its occurrence as shown on Figure 28. It has been mined very extensively on a commercial scale since the completion of the Norfolk & Western Railway into this region in 1892, thus resulting in a large portion of the 20 square miles determined for this bed in the District being mined out.

The 13 following commercial mines on the No. 3 Pocahontas Coal in North Fork District were sampled previous to 1914 and the results published in former Reports of the State Survey on the pages designated in the right-hand column. The analyses are republished under the corresponding mine number on Map II in the tables at the end of this Chapter :

Mine No. on Map II	Elevation Above Sea Level	Name of Company.	Location.	Page References to Bulletin 2.
126	1925B	Elk Ridge C. & C. Co.	North Fork Sta., 0.7 mi. East	211-212, No. 9
127	1878B	Algoma C. & C. Co., (Piney).....	Gilliam, 0.3 mi. N.W.	211-212, No. 8
128	1910B	Gilliam C. & C. Co...	Gilliam, 0.1 mi. N.	211-212, No. 18
129	2030B	Poca. Cons. Coll. Co., (Rolfe).....	Rolfe, 0.1 mi. N.	211-212, No. 7
130	2126L	Indian Ridge C. & C. Co.....	Bearwallow Sta., 0.9 mi. N.E.	211-212, No. 4
131	2095B	Roanoke C. & C. Co..	Bearwallow Sta., 0.4 mi. S.E.	211-212, No. 3
132	2165B	Arlington C. & C. Co..	Bearwallow Sta., 0.9 mi. S.E.	211-212, No. 5
133	2160B	McDowell C. & C. Co.	McDowell, 0.1 mi. S.E.	211-212, No. 2
134	2309L	Ashland C. & C. Co..	Ashland, 0.3 mi. N.E.	211-212, No. 1
135	2195B	Greenbrier C. & C. Co.	McDowell, 1.0 mi. S.E.	211-212, No. 6
162	1785B	Keystone C. & C. Co., No. 2.....	Keystone, 1.1 mi. N.E.	216, No. 51
168	2410L	Zenith C. & C. Co....	Crumpler, 0.1 mi. N.E.	217, No. 64
169	2375B	Poca. Cons. Coll. Co..	Ashland, 1.1 mi. S.E.	213, No. 8

Elkhorn District, McDowell County.

In Elkhorn District, the No. 3 Pocahontas Coal attains minable dimensions throughout the region of its occurrence as shown on Figure 28. As in North Fork District, it has been mined very extensively on a commercial scale since 1892, thus resulting in a considerable portion of the 13 square miles determined for this bed in the District being mined out.

The 13 following commercial mines in Elkhorn District on the No. 3 Pocahontas Coal were sampled previous to 1914 and the results published in former Reports of the State Survey, on the pages designated in the right-hand column. The analyses are republished under the corresponding mine number on Map II in the tables at the end of this Chapter:

Mine No. on Map II	Elevation Above Sea Level	Name of Company.	Location.	Page References to Bulletin 2.
136	1940B	Lynchburg C. & C. Co...	Kyle, 0.3 mi. S.W.	211-212, No. 19
137	1995B	Powhatan C. & C. Co....	Kyle, 0.7 mi. E.	211-212, No. 20
138	1980B	Houston C. & C. Co No. 1.....	Upland, 0.2 mi. S.	211-212, No. 22
139	1990B	Upland C. & C. Co.....	Elkhorn, 0.6 mi. S.W.	211-212, No. 21
140	2035B	Crozer C. & C. Co. No. 1	Elkhorn	211-212, No. 24
141	2120B	Turkey Gap C. & C. Co..	Ennis	211-212, No. 23
142	2125B	Norfolk C. & C. Co, (Lick Branch).....	Ennis, 0.3 mi. S.W.	211-212, No. 25
143	2180B	Norfolk C. & C. Co., (Delta).....	Ennis, 0.7 mi. E.	211-212, No. 27
144	2225B	Shamokin C. & C. Co....	Ennis, 0.8 mi. S.E.	211-212, No. 29
145	2325B	Elkhorn C. & C. Co.....	Maybeury, 0.6 mi. S.E.	211-212, No. 30
146	2340B	Norfolk C. & C. Co., (Angle).....	Maybeury, 1.2 mi. E.	211-212, No. 26
147	2340B	Norfolk C. & C. Co.....	Maybeury, 1.2 mi. E.	211-212, No. 28
170	2075B	Crozer C. & C. Co., No. 2	Ennis, 0.3 mi. N.W.	216, No. 48

Quantity of No. 3 Pocahontas Coal Available.

Based on the foregoing evidence and a planimetric determination by Gawthrop of the area from Map II as the bed is limited on Figure 28, the following estimate is made for the probable amount of the No. 3 Pocahontas Coal available in each County:

Probable Amount of No. 3 Pocahontas Coal.

Counties by Districts.	Thickness of Coal Assumed. Feet.	Square Miles.	Acres.	Cubic Feet of Coal.	Short Tons of Coal.
Wyoming:					
Slab Fork.....	3.5	30.0	19,200	2,927,232,000	117,089,280
Center	3.5	50.0	32,000	4,878,720,000	195,148,800
Barkers Ridge.	3.5	92.0	58,880	8,976,844,800	359,073,792
Totals.....	.....	172.0	110,080	16,782,796,800	671,311,872
McDowell:					
Browns Creek.	4	55.0	35,200	6,133,248,000	245,329,920
Big Creek.....	4	65.0	41,600	7,248,384,000	289,935,360
Adkin.....	5	58.0	37,120	8,084,736,000	323,389,440
North Fork....	6	20.0	12,800	3,345,408,000	133,816,320
Elkhorn.....	6	13.0	8,320	2,174,515,200	86,980,608
Totals.....	.....	211.0	135,040	26,986,291,200	1,079,451,648
Totals for Both Counties		383.0	245,120	43,769,088,000	1,750,763,520

Coke from No. 3 Pocahontas Coal.

The No. 3 Pocahontas Coal has been coked on an extensive scale in bee-hive ovens on the waters of Elkhorn Creek in McDowell County. The character of the coke is shown by the following table of analyses of 32 samples of coke collected under the supervision of S. D. Brady, the results of the chemical determinations being first published in Volume II, page 698 of the State Survey Reports, as follows:

Coke—Pocahontas (No. 3) Vein.

Analyses Nos.	Mois.	V.M.	F.C.	Ash.	Sul.	Phos.	Coking time.
1.....	0.14	0.91	90.18	8.77	0.78	0.009	48 hrs.
2.....	0.10	0.98	92.70	6.22	0.68	0.0125	"
3.....	0.06	0.71	92.68	6.55	0.67	0.0045	"
4.....	0.05	0.98	91.47	7.50	0.72	0.005	"
5.....	0.14	1.12	89.14	9.60	0.56	0.0055	72 hrs.
6.....	0.08	1.17	88.30	10.45	0.65	0.006	48 hrs.
7.....	0.05	0.82	94.46	4.67	0.51	0.0035	"
8.....	0.09	0.93	91.95	7.03	0.58	0.006	"
9.....	0.05	0.84	93.49	5.62	0.50	0.0035	"
10.....	0.14	0.90	92.73	6.23	0.63	0.0045	"
11.....	0.09	1.21	83.57	15.13	0.44	0.0105	72 hrs.
12.....	0.06	1.07	90.67	8.20	0.44	0.0065	"
13.....	0.14	0.88	86.69	12.29	0.48	0.0065	"
14.....	0.04	1.01	88.63	10.32	0.39	0.007	"
15.....	0.14	0.98	88.82	10.06	0.43	0.006	"

Analyses Nos.	Mois.	V.M.	F.C.	Ash.	Sul.	Phos.	Coking time.
16.....	0.11	1.30	85.81	12.78	0.49	0.0085	48 hrs
17.....	0.08	0.64	90.30	8.98	0.49	0.0055	72 hrs.
18.....	0.08	1.05	88.00	10.87	0.54	0.007	48 hrs.
19.....	0.14	1.16	92.58	6.12	0.64	0.0067	72 hrs.
20.....	0.06	0.79	93.77	5.38	0.61	0.0045	"
21.....	0.21	0.92	92.80	6.07	0.65	0.0075	"
22.....	0.08	0.82	93.13	5.97	0.55	0.0096	"
23.....	0.07	0.89	92.38	6.66	0.67	0.0025	48 hrs.
24.....	0.04	0.83	93.09	6.04	0.54	0.004	"
25.....	0.05	1.10	91.15	7.70	0.55	0.005	"
26.....	0.08	0.97	91.92	7.03	0.62	0.0065	72 hrs.
27.....	0.10	0.93	92.59	6.38	0.66	0.005	"
28.....	0.12	1.29	92.38	6.21	0.60	0.0065	48 hrs.
29.....	0.15	1.13	88.00	10.72	0.60	0.0055	"
30.....	0.10	1.21	91.92	6.77	0.58	0.005	"
31.....	0.05	0.69	92.66	6.60	0.68	0.004	"
32.....	0.09	1.10	93.67	5.14	0.62	0.0035	"
Average.....	0.09	0.98	90.99	7.94	0.58	0.0061	

Location of Samples, McDowell County.

Analy. No. on
Nos. Map II.

1. 103. From Tidewater C. & C. Co. ovens, one-half mile west of Vivian.
2. 105. From Peerless C. & C. Co. ovens, Vivian.
3. 138. From Houston C. & C. Co. ovens, Elkham.
4. 110. From Keystone C. & C. Co. ovens, Keystone.
5. 128. From Gilliam C. & C. Co. ovens, one mile and three-fourths east of North Fork.
6. 137. From Powhatan C. & C. Co. ovens, Powhatan mine.
7. 145. From Elkhorn C. & C. Co. ovens, Elkhorn mine.
8. 136. From Lynchburg C. & C. Co. ovens, Lynchburg mine.
9. 144. From Shamokin C. & C. Co. ovens, Shamokin mine.
10. 141. From Turkey Gap C. & C. Co. ovens, Turkey Gap mine.
11. 134. From Ashland C. & C. Co. ovens, Ashland.
12. 133. From McDowell C. & C. Co. ovens, McDowell.
13. 131. From Roanoke C. & C. Co. ovens, one-half mile below McDowell.
14. 130. From Indian Ridge C. & C. Co. ovens, one mile and one-half below McDowell.
15. 132. From Arlington C. & C. Co. ovens, Arlington.
16. 129. From Rolfe C. & C. Co. ovens, Rolfe.
17. 135. From Greenbrier C. & C. Co. ovens, one mile south of Greenbrier.
18. From Louisville C. & C. Co. ovens, Goodwill.
19. 127. From Algoma C. & C. Co. ovens, Algoma mine.
20. 126. From Elk Ridge C. & C. Co. ovens, Elk Ridge mine.
21. 109. From Eureka C. & C. Co. ovens, Eureka mine.
22. 107. From Shawnee C. & C. Co. ovens, Shawnee mine.
23. From Buckeye C. & C. Co. ovens, Buckeye mine.
24. 147. From Norfolk C. & C. Co. ovens, Switch Back.
25. 142. From Norfolk C. & C. Co. ovens, Lick Branch mine.
26. 139. From Upland C. & C. Co. ovens, Upland mine.
27. 140. From Crozer C. & C. Co. ovens, Crozer mine.

Mercer County.

28. From Coaldale C. & C. Co. ovens, Coaldale.
29. From Goodwill C. & C. Co. ovens, Goodwill mine.
30. From Booth-Bowen C. & C. Co. ovens, Simmons Creek.
31. From Mill Creek C. & C. Co. ovens, Ruth.
32. From Pocahontas Collieries Co. ovens, "Baby mine," Pocahontas.

The above average analysis of the 32 samples, manufactured in bee-hive ovens, reveals a coke of great purity, its greatest weakness being this purity itself, contradictory as this statement may seem, since the burden carrying strength of such coke in the blast furnace is lower than it would be had it contained 9 to 10 per cent. of ash. On Tug Fork in McDowell County, the U. S. Coal & Coke Co. of Gary has discontinued the use of its large number of bee-hive ovens entirely, and its output of coal from both Nos. 3 and 4 Pocahontas seams for coking purposes is now shipped to their by-product ovens at Gary, Indiana, and Joliet, Illinois, and mixed with other high volatile coals and the mixture coked in the Koppers type of by-product oven, resulting in a coke highly satisfactory for furnace and other metallurgical purposes, and saving the valuable by-products like ammonia, coal tar and 6000 feet of surplus fuel gas for every ton of coal used. The following extract from pages 46-48 of a paper by Carl A. Meissner, Chairman, Coke Committee, U. S. Steel Corporation, entitled "The Modern By-Product Ovens—A Practical Method of Conserving Our Coal Supply," and read at the Fourth General Meeting of the American Iron and Steel Institute in New York, May 23, 1913, is of special interest in this connection.

"In conclusion, permit me to express my firm conviction that, when located at points suitable to its requirements, the by-product coke oven is the most satisfactory and economical system yet known for the manufacture of metallurgical coke.

"It also furnishes a desirable method for the production of illuminating gas and domestic coke, and we are able to use practically all the valuable constituents of coal.

"As a great conserver of the national resources of the country's fuel, it should receive the closest study. Take the Gary (Ind.) by-product coke-oven plant as a concrete example: In the last six months of 1912 we actually produced coke at the rate of 2,900,000 tons per year on a mixture of 76.4 per cent. Pocahontas and 23.6 per cent. high volatile coals. The conservation of coal through producing this amount of coke in by-product ovens instead of bee-hive ovens amounts to about 1,190,000 tons per year. Furthermore, the actual utilization of the

surplus gas for various heating purposes at this plant for the same period is equivalent to an annual saving by replacement of practically 500,000 tons of coal. In other words, in the annual production of 2,900,000 tons of coke at the Gary (Ind.) by-product coke-oven plant, a saving of practically 1,700,000 tons of coal, based on above mixture of low and high volatile coals, has been accomplished, which means the conservation of that amount of the coal of our national coal reserves from the operation of that one plant alone. This amount of conservation would not occur in case of using all high volatile coals, because the difference in yield from the low volatile Pocahontas Coal when coked in retort ovens as against bee-hive ovens is much greater than is the case with high volatile coals. For instance, if the above-mentioned tonnage of coke had been produced entirely from Connellsville Coal, the saving of coal due to the greater yield in retort ovens would have amounted to about 475,000 tons per year. This, with the saving due to replacement of about 500,000 tons of coal by surplus gas, would give a total conservation of practically 1,000,000 tons of coal per year when using all Connellsville Coal, as against 1,700,000 tons of coal per year when using the mixture at Gary, Ind., above referred to.

"The coke produced in by-product coke ovens, when properly made, is fully equal in quality to that produced in bee-hive ovens. It is possible to utilize a large variety of coals, when properly selected and mixed, including coals which up to the present time have been practically regarded as 'non-coking coals', and make a highly satisfactory metallurgical coke.

"I am distinctly of the opinion that in this country the by-product coke should in most cases be made at the blast furnace plants and not at the coal mines, for in this way it becomes possible to mix coals from various localities to great advantage. I believe that the operation of blast furnaces and coke ovens can be conducted in a more intelligent manner when the coke ovens are located at the blast furnace plant and are under the same management; this also allows a better distributing point for the by-products, such as tar and gas, which can be consumed to great advantage in the works when the blast furnaces are connected with large steel plants.

"As to the constructive features of by-product coke ovens, which I have described somewhat in my paper, while we have learned a great deal from the Germans, yet I am frank to say I think we have improved very greatly, not only on their construction, but also on their practice, particularly in the amount of output per day per oven, at the same time preserving, if not improving, the quality of the coke by so doing.

"As to the possible overproduction of nitrogen, careful study of the whole situation would indicate we need have no apprehension that the supply will exceed the demand. The increasing production of ammonium sulphate is making it possible to supply the farmer with the nitrogen he requires for intensive farming, and as this supply increases he will be able to cultivate his land to better advantage and obtain a large product per acre. I also believe as the supply increases it will tend to stimulate that demand which at present lies dormant.

"In the United States there were produced in 1912 about 200,000 tons of ammonium sulphate and sulphate equivalent. We consumed approximately 230,000 tons, or considerably more than the production. If we recovered the ammonium sulphate from all the 53,000,000 tons of coal coked in this country in that year, it would have amounted to nearly half a million tons, or about twice the present consumption. If the present rate of consumption increases in anything like the ratio

for the last 10 years, then the consumption of ammonium sulphate will in a comparatively few years equal the greatest possible production obtainable through the coking of coal, and we all realize that before all of the coal is coked in by-product ovens in this country more than 10 years must have elapsed. The probabilities are that the increase in the demand for ammonium sulphate produced from coal will in time exceed the supply from this source, so that the further supply of nitrogen must come through the use of nitrate of soda from Chile, which has been and still is extensively used, and through other methods of obtaining it, such as from cyanamid, of which approximately 250,000 tons per year are being produced, as well as synthetic ammonium nitrate and sulphate processes, peat, etc. Some of these latter processes, however, can still be stated to be in the experimental stage, even though large amounts of money have already been spent in efforts to develop them. Their value as competitors to the present known and used fertilizers through their ultimate economical production is too uncertain at this time to be discussed by me in detail.

"A careful study of what the various Governments are doing through their agricultural departments, in the way of educating the farmers as to the advantages of artificial fertilizers and a consideration of what is likely to take place in the production of nitrogen from the above sources, leads me to believe that the demand for artificial fertilizers for a great many years to come will be in excess of the supply.

"Referring once more to the sulphate of ammonia, my conclusions are that the nitrogen in sulphate of ammonia can be produced at a lower cost than in any of the above sources of supply; in other words, that considering all of the above sources of supply, sulphate of ammonia, as made in the by-product coke ovens, will at all times give a handsome return on the money invested.

"There is an ever-increasing demand for the surplus gas for the many different uses of heating required in a steel plant or for illuminating purposes which will always cause the surplus gas to remain a by-product of great value.

"The use of tar, which formerly was a drug on the market, has of late been greatly stimulated as its advantages for roofing purposes, binder for road building, creosoting, burning in open-hearth furnaces, etc., have become more fully recognized.

"Benzol is now extensively used abroad as a motor fuel, and the same conditions are likely to prevail here. Recent tests have shown that benzol is the equivalent of gasoline for this purpose. In fact, better results have been obtained with it in automobiles than with gasoline.

"As I previously stated, all of the coke in Germany is made in retort coke ovens, and about 80 per cent. of these are equipped for recovery of by-products. From the rapid progress that is being made in this country, I firmly believe that the time is coming when the same condition will prevail in the United States."

ABSENCE OF COAL IN THE MAUCH CHUNK SERIES.

As shown in Chapter VIII, there is a complete absence of coal of minable thickness and purity in the Mauch Chunk division of the Mississippian as represented in the area under discussion, although a thin seam—less than 12 inches—was observed in these measures in the north of Raleigh County along the west hillside of New River.

SUMMARY OF AVAILABLE COAL.

On preceding pages of this Chapter there is given at the end of the discussion of each of the 33 minable coals an estimate of the available tonnage for each bed by magisterial districts along with the totals for each County. The following table, with the coals arranged in descending order, gives a summary of these estimates for each County, as also the totals for both :

Summary of Available Coal.

Coal Seam.	Mines and Prospects Listed on Map II and Described in Chapter.	Short Tons Coal Wyoming County.	(2000 Lbs.) Coal McDowell County.
No. 5 Block.....		1,296,345	
Stockton.....	171	11,151,360	
Coalburg.....		22,302,720	
Winifrede.....		20,072,448	
Chilton.....		75,829,248	
Williamson.....	172	54,641,664	836,352
Cedar Grove.....	1 and 173-6	120,992,256	3,345,408
Lower Cedar Grove.....	2-3 and 177-9	110,733,005	3,568,435
Alma.....	180-4	92,667,801	4,014,489
Campbell Creek, ("No. 2 Gas").....	185-197	254,106,037	10,705,305
Powellton.....	198-204	153,509,621	11,151,360
Matewan.....	4 and 205-212	167,359,609	15,611,904
Eagle ("Middle War Eagle").....	5-10 and 213-240	315,137,432	50,448,752
Bens Creek.....	241-7	21,187,584	38,137,651
Little Eagle.....	11-12 and 248-288	306,383,616	75,829,248
Cedar.....	289A-294	32,338,944	67,577,241
Lower War Eagle.....	13 and 295-330	254,251,008	101,700,402
Glenalum Tunnel.....	14-15 and 331-360	307,108,454	140,507,135
Gilbert.....	16-19 and 361-400	220,573,900	125,564,313
Douglas.....	20-25 and 401-455	169,500,672	211,987,353
Lower Douglas.....	456-492		107,053,056
Iaeger.....	26-27 and 493-535	75,271,680	290,269,900
Sewell "B".....	536-551	23,975,424	95,901,696
Sewell ("Davy").....	28-52, 148 and 552-622	376,915,968	489,879,243
Welch.....	53-66, 149-52, 623-53	30,108,672	330,080,256
Beckley ("War Creek").....	68-77, 153-6, 657-97A	381,376,512	657,930,240
Fire Creek.....	78-79 and 698-733	340,116,480	524,113,920
No. 9 Pocahontas.....	80 and 734-763	153,331,200	22,302,720
No. 7 Pocahontas.....	81 and 764-74, 796	46,835,712	30,666,240
No. 6 Pocahontas.....	82-3, 775-95, 797-9	167,270,400	53,526,528
No. 5 Pocahontas.....	803-7		73,598,976
No. 4 Pocahontas.....	84-96, 157-8, 808-826	83,635,200	724,838,400
No. 3 Pocahontas.....	97-147, 159-70, 827-893	671,311,872	1,079,451,648
Totals.....		5,061,292,844	5,340,598,171
Totals for Both Counties.....			10,401,891,015

The above summary is believed to represent approximately the amount of coal that was in the ground before mining operations were begun. The Annual Report of the West Virginia Department of Mines for the year ending June 30,

1913, shows that 138,728,068 long tons had been mined for commercial use in the two counties. Reducing these figures to a short ton (2000 pounds) basis, the total is 155,375,426 tons. For the two years that have elapsed since June 30, 1913, probably enough has been mined to make the total 188,000,000 short tons. The amount of coal unrecovered in old ribs and pillars will probably bring the total up to 200,000,000 short tons, which sum should be deducted from the total for both Counties in the above summary. The amount of coal available, after making this correction, is in round numbers 10,200,000,000 short tons. Assuming an average recovery of 80 per cent., which appears conservative under modern and constantly improving mining methods, the probable amount of coal to be eventually mined in the territory of this Report is in round numbers 8,160,000,000 short tons.

MINABLE COAL BY MAGISTERIAL DISTRICTS.

All the minable coals have been described on previous pages of this Chapter by magisterial Districts. In order to facilitate investigation of the coal resources of any special portion of the area under discussion, the Index at the end of this Report, under the heading of "Mina-ble Coals by Magisterial Districts," gives a list of page references which should make all the information herein readily available.

TABLES OF COAL ANALYSES.

The following table contains the chemical analyses of 147 coal mines and prospects within the territory of this Report, along with many calorific tests, the determinations of which were made in the laboratories of the State Geological Survey. The chemical and calorific work on the samples collected during 1914 was done mostly by J. B. Krak, Assistant Chemist, aided by W. L. Linton, temporary employee, under the direction and with the assistance of B. H. Hite, Chief Chemist. The samples for the commercial mines were collected by Gawthrop following closely the method in vogue with the U. S. Bureau of Mines, these being quartered down and sealed in tin cans

in the mine. Those from country banks were collected in small sacks with as much care as possible when depending on a saddle-bag equipment. Some of the results were formerly published in Volumes II and II(A) and Bulletin 2, these having been determined by former members of the Survey Staff. The numbers at the left-hand margin correspond with the numbers given in the mine sections in the text and with the mine symbols on Map II. The table of analyses is followed immediately by another giving the accurate location of the mine or prospect and page references to its description:

Table of Coal Analyses by W. Va. Geological Survey.

No. on Map 11	Mine	County	Coal Bed	Condition of Sample	PROXIMATE					Common to Both		ULTIMATE				Calorimeter B. T. U. for 1 lb. of Coal	Calculated B. T. U. for 1 lb. of Coal	Carbon Divided by Oxygen + Ash
					Moisture	Volatile Matter	Fixed Carbon	Phosphorus	Ash.	Sulphur	Carbon	Hydrogen	Oxygen	Nitrogen				
1	David C. S.	W. Va.	Cedar Grove, M. S.	A. R.	0.56	32.80	63.42	0.009	3.28	0.65								
2	Big Hill Coal Co.	W. Va.	L. Cedar Grove, M. S.	A. R.	0.26	32.09	64.94	0.004	2.71	0.71								
3	Beck C. S. C.	W. Va.	L. Cedar Grove, M. S.	A. R.	0.58	34.46	59.86	0.009	5.10	0.65								
4	Beck C. S. C.	W. Va.	Matewan, M. S.	A. R.	1.95	30.61	64.10	0.009	3.34	0.91								
5	Beck C. S. C.	W. Va.	Eagle, M. S.	A. R.	0.36	31.14	63.46	0.005	5.04	2.68								
6	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.47	29.65	67.04	0.005	2.84	0.55								
7	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.78	29.56	66.36	0.008	3.30	0.66								
8	Medlow C. & C. Co. (Mohawk)	W. Va.	Eagle, M. S.	A. D.	1.65	28.15	64.99	0.004	5.21	1.19					1.24	14,348	14,375	
9	Medlow C. & C. Co. (Mohawk)	W. Va.	Eagle, M. S.	A. R.	2.03	33.46	60.91	0.006	5.19	1.20					1.24	14,294	14,332	
10	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. D.	1.11	34.46	60.91	0.006	3.52	1.29					5.14	7.12	6.51	
11	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	1.96	34.16	60.39	0.006	3.49	1.28					5.39	6.41	6.51	
12	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.86	32.07	62.97	0.007	4.10	1.21					81.52	7.13	7.67	
13	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. D.	2.07	31.68	62.90	0.007	4.05	1.20					5.00	5.46	5.00	
14	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	1.21	31.56	62.90	0.006	4.27	1.23					1.25	14,740	14,800	
15	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	1.28	30.71	64.03	0.006	4.97	1.20					1.24	14,560	14,620	
16	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.84	31.79	65.05	0.003	2.32	1.10					1.22	14,689	14,675	
17	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.65	29.37	61.96	0.02	8.02	1.63					6.24	6.91	7.88	
18	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.79	27.40	65.56	0.011	6.25	0.73					5.21	6.91	7.32	
19	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.65	27.24	67.00	0.012	5.11	0.55								
20	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.46	25.92	66.30	0.007	7.32	2.32								
21	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.29	29.05	62.91	0.015	7.75	0.74								
22	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.82	30.20	60.17	0.028	8.81	2.20								
23	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.87	26.21	65.04	0.022	7.88	0.77								
24	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.61	27.84	63.61	0.018	7.94	1.51								
25	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.33	27.62	68.58	0.007	3.47	0.71								
26	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.45	27.23	66.70	0.014	5.62	2.51								
27	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	2.35	27.95	66.85	0.066	2.85	0.60								
28	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.42	23.66	68.78	0.035	7.14	0.67								
29	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	2.68	30.28	64.36	0.006	2.68	0.81								
30	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. D.	0.82	26.52	70.20	0.004	2.46	0.65								
31	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	2.53	26.07	68.99	0.004	2.41	0.65								
32	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	1.46	27.13	67.38	0.012	4.03	0.66								
33	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	9.36	23.90	68.03	0.022	7.71	2.09								
34	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.87	25.61	68.58	0.011	4.64	0.66								
35	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.97	23.77	72.79	0.011	2.47	0.52								
36	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.35	23.67	72.19	0.007	3.79	1.31								
37	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.90	23.65	73.11	0.007	2.34	0.80								
38	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.48	23.54	71.97	0.008	4.01	0.91								
39	Parlee Lumber Co.	W. Va.	Eagle, M. S.	A. R.	0.29	21.93	73.75	0.003	4.03	0.76								

Table of Coal Analyses by W. Va. Geological Survey.—Continued.

No. on Map II.	Mine	County	Coal Bed	Condition of Sample	PROXIMATE				Common to Both	ULTIMATE				Calorimeter B. T. U. for 1 lb. of Coal	Calculated B. T. U. for 1 lb. of Coal	Carbon Divided by (Oxygen + Ash)		
					Moisture	Volatile Matter	Fixed Carbon	Phosphorus		Ash.	Sulphur	Carbon	Hydrogen				Oxygen	Nitrogen
33	Belle C. Co. (Cambridge)	McD.	Sewell, M.	A. D.	0.16	18.75	75.22	0.0058	5.87	1.34	87.11	4.59	2.71	15,230	15,458	13.38		
34	Solvey Coll. Co. (Big Sandy)	McD.	Sewell, M.	A. D.	0.12	18.90	77.50	0.0027	3.48	0.58	87.11	4.59	2.71	15,458	15,329	13.38		
35	I. B. B. Coal Co. No. 3	McD.	Sewell, M.	A. D.	0.80	18.30	77.10	0.007	3.80	0.62	86.42	4.68	3.35	15,458	15,329	13.38		
36	Solvey Coll. Co. (Tug River)	McD.	Sewell, M.	A. R.	1.59	18.16	76.48	0.007	3.77	0.65	86.42	4.68	3.35	15,335	15,235	12.13		
37	I. B. B. Coal Co. No. 2	McD.	Sewell, M.	A. D.	0.25	18.72	77.52	0.005	3.51	0.65	86.42	4.68	3.35	15,335	15,235	12.13		
37	I. B. B. Coal Co. No. 2	McD.	Sewell, M.	A. D.	0.30	19.30	77.97	0.006	2.43	0.64	88.37	4.43	3.02	15,584		16.19		
38	I. B. B. Coal Co. No. 5	McD.	Sewell, M.	A. R.	0.55	18.65	77.50	0.006	2.41	0.64	87.57	4.52	3.66	1,201,537,3	15,284	14.42		
38	I. B. B. Coal Co. No. 5	McD.	Sewell, M.	A. R.	1.34	18.50	76.89	0.006	3.27	0.66	86.45	4.31	4.07	1,201,548,7	14,958	11.73		
39	I. B. Coal Co (Maher) No. 1	McD.	Sewell, M.	A. D.	0.80	18.20	77.70	0.009	3.30	0.72	85.77	4.40	4.71	1,191,536,5	14,866	10.75		
40	I. B. B. Coal Co. (Twin Branch)	McD.	Sewell, M.	A. R.	3.78	17.66	75.36	0.009	3.20	0.70	83.60	4.66	6.68	1,161,493,8	14,562	8.46		
41	Superior-Poca C. Co. No. 1	McD.	Sewell, M.	A. D.	0.16	17.49	78.63	0.005	3.72	0.59				15,272				
41	Superior-Poca C. Co. No. 1	McD.	Sewell, M.	A. D.	0.75	17.65	79.07	0.007	2.53	0.80	86.66	4.89	3.91	1,211,568,5	15,363	13.45		
42	Superior-Poca C. Co. No. 2 1/2	McD.	Sewell, M.	A. R.	1.66	17.49	78.34	0.007	2.51	0.79	85.87	4.99	4.64	1,201,554,3	15,258	12.01		
43	Superior-Poca C. Co. No. 2 1/2	McD.	Sewell, M.	A. D.	0.90	17.70	78.60	0.012	2.80	0.62	86.87	4.51	3.97	1,231,568,2	15,152	12.83		
43	Superior-Poca C. Co. No. 2 1/2	McD.	Sewell, M.	A. R.	1.96	17.51	77.76	0.012	2.77	0.61	85.99	4.63	4.78	1,221,551,4	15,030	11.39		
44	I. B. B. Coal Co. No. 6	McD.	Sewell, M.	A. R.	1.40	20.94	74.90	0.002	2.76	0.58								
45	Short Creek C. & C. (Short Creek)	McD.	Sewell, M.	A. R.	0.21	17.70	78.17	0.0025	3.92	1.63				15,308				
46	Pando Coal Co.	McD.	Sewell, M.	A. D.	0.40	17.30	78.74	0.015	3.56	0.68	86.48	4.37	3.71	1,201,547,7	15,029	11.88		
47	Flanagan C. Co. No. 2	McD.	Sewell, M.	A. R.	1.05	20.17	73.86	0.003	4.92	0.96								
48	Davy Poca C. Co. No. 2	McD.	Sewell, M.	A. R.	0.92	20.10	75.36	0.003	3.62	0.89								
49	Premier Poca C. Co. No. 2 1/2	McD.	Sewell, M.	A. D.	0.44	20.95	75.89	0.024	2.72	0.60	88.20	4.69	2.52	1,271,540,0	15,560	16.83		
49	Premier Poca C. Co. No. 2 1/2	McD.	Sewell, M.	A. R.	1.94	20.63	74.75	0.024	2.68	0.59	86.87	4.78	3.83	1,251,517,0	15,330	13.34		
50	Carter C. Co. (Nova)	McD.	Sewell, M.	A. R.	1.87	18.71	77.32	0.021	2.10	0.60								
51	Carter C. Co. No. 6	McD.	Sewell, M.	A. R.	1.20	19.67	75.80	0.006	3.33	0.91								
51	Carter C. Co. No. 6	McD.	Sewell, M.	A. R.														
51	Carter C. Co. No. 6	McD.	Sewell, M.	A. R.														
52	Henrietta Poca C. Co.	McD.	Sewell, M.	A. D.	0.56	20.67	70.22	0.015	8.55	0.60	81.98	4.56	3.24	1,071,423,0	14,520	6.96		
52	Henrietta Poca C. Co.	McD.	Sewell, M.	A. R.	3.72	20.02	67.93	0.015	8.28	0.58	79.37	4.76	5.97	1,041,377,0	14,060	5.57		
Average					0.46	18.59	77.13	0.0088	3.82	0.77	86.44	4.52	3.40	1,201,529,9	15,136	12.74		
53	Colonial Poca C. Co. No. 2	McD.	Welch, M.	A. D.	1.47	20.29	74.78	0.0087	3.46	0.75	85.18	4.68	4.70	1,115,126,1	14,953	11.01		
53	Colonial Poca C. Co. No. 2	McD.	Welch, M.	A. R.	0.37	22.73	68.12	0.008	8.78	0.71	81.31	4.67	3.42	1,111,424,0	14,480	6.66		
54	Evans Poca C. Co.	McD.	Welch, M.	A. R.	1.44	22.49	67.38	0.008	8.69	0.70	80.42	4.77	4.33	1,091,400,0	14,330	6.18		
55	Muller Coal Mining Co.	McD.	Welch, M.	A. R.	1.06	21.00	71.17	0.019	6.77	0.54								
56	Camble'd Canal C. Co. (Gem Poca.) No. 2	McD.	Welch, M.	A. R.	0.25	21.23	70.94	0.01	6.58	1.17								
57	Pando C. Co.	McD.	Welch, M.	A. R.	0.77	20.88	69.80	0.004	8.55	0.55								
57	Pando C. Co.	McD.	Welch, M.	A. D.	0.80	16.65	73.56	0.037	8.99	1.34	81.55	3.91	3.06	1,151,469,9	14,108	6.77		
58	New Poca C. Co. No. 2	McD.	Welch, M.	A. R.	1.65	16.51	72.92	0.037	8.92	1.33	81.10	4.00	3.51	1,141,450,5	14,058	6.52		
58	New Poca C. Co. No. 2	McD.	Welch, M.	A. R.	1.10	19.29	71.78	0.035	7.83	0.65								

Table of Coal Analyses by W. Va. Geological Survey.—Continued.

No.	Name	County	Coal Bed	Condition of Sample	PROXIMATE				Common to Both	ULTIMATE				Calculated B. T. U. for 1 lb. of Coal	Carbon Divided by Oxygen + Ash		
					Moisture	Volatile Matter	Fixed Carbon	Phosphorus		Ash.	Sulphur	Carbon	Hydrogen			Oxygen	Nitrogen
29	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. D.	0.90	16.90	76.33	0.011	5.87	0.61	85.36	4.31	2.62	1.23	15 163	14.908	10.05
30	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. R.	1.93	16.73	75.53	0.034	5.81	0.61	84.48	4.42	3.46	1.22	15,008	14,788	9.11
31	W. Va. C. Co. (Hemphill).	MeD.	Welch, M.	A. D.	0.90	21.80	68.60	0.034	8.70	0.55	76.53	3.91	9.33	0.98	13,015	12,865	4.22
32	W. Va. C. Co. (Hemphill).	MeD.	Welch, M.	A. R.	0.90	16.40	75.44	0.011	7.86	0.55	82.22	4.19	3.82	1.36	14,632	14,279	7.04
33	W. Va. C. Co. (Hemphill).	MeD.	Welch, M.	A. R.	1.00	16.29	74.90	0.011	7.81	0.55	81.64	4.27	4.38	1.35	14,532	14,203	6.69
34	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. R.	1.18	19.27	74.14	0.009	5.41	0.66	85.26	4.68	3.19	1.25	14,810	14,950	9.21
35	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	0.50	20.59	72.94	0.029	5.97	0.62	84.29	4.79	4.86	1.23	14,530	14,660	7.71
36	W. Va. C. Co. No. 3.	MeD.	Welch, M.	A. R.	2.43	20.19	71.53	0.029	5.85	0.61	82.66	4.79	4.86	1.23	14,530	14,660	7.71
37	W. Va. C. Co. No. 4.	MeD.	Welch, M.	A. R.	2.43	20.19	71.53	0.029	5.85	0.61	82.66	4.79	4.86	1.23	14,530	14,660	7.71
38	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. R.	0.80	16.84	76.41	0.008	5.95	0.68	84.68	4.21	3.25	1.23	14,845	14,701	9.20
39	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. D.	0.65	18.84	73.06	0.02	7.45	0.72	82.28	4.27	4.10	1.19	14,476	14,327	7.59
40	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. R.	1.38	19.39	72.01	0.017	7.22	0.74	82.06	4.45	4.11	1.21	14,532	14,407	7.24
41	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. R.	1.17	19.63	76.52	0.005	2.68	0.77	82.06	4.45	4.11	1.21	14,532	14,407	7.24
42	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. R.	0.29	22.03	75.62	0.013	2.06	1.44	78.72	4.59	2.13	1.04	13,800	14,190	5.55
43	W. Va. C. Co. No. 1.	MeD.	Welch, M.	A. D.	0.57	19.24	68.14	0.015	12.05	1.47	78.72	4.59	2.13	1.04	13,800	14,190	5.55
44	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	1.05	19.15	67.82	0.015	11.98	1.46	78.36	4.62	2.55	1.03	13,730	14,120	5.39
45	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.80	18.40	72.64	0.004	8.16	0.69	81.64	4.27	4.10	1.19	14,476	14,327	5.39
46	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	1.13	16.73	75.23	0.012	6.91	0.56	81.64	4.27	4.10	1.19	14,476	14,327	5.39
47	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	1.03	16.95	74.19	0.008	7.83	0.56	81.64	4.27	4.10	1.19	14,476	14,327	5.39
48	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.93	18.11	71.96	0.019	9.00	0.56	81.64	4.27	4.10	1.19	14,476	14,327	5.39
49	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.80	15.10	75.95	0.030	8.15	0.62	82.68	4.07	3.43	1.05	14,554	14,263	7.14
50	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.80	16.99	74.49	0.028	7.72	0.63	82.68	4.07	3.43	1.05	14,554	14,263	7.14
51	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.80	16.99	74.49	0.028	7.72	0.63	82.68	4.07	3.43	1.05	14,554	14,263	7.14
52	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	0.80	18.23	72.86	0.013	8.21	0.69	81.89	4.81	3.34	1.06	14,430	14,670	7.09
53	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	2.67	17.87	71.41	0.013	8.05	0.68	80.25	4.93	5.04	1.05	14,150	14,380	6.13
54	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	1.15	17.71	73.45	0.023	7.69	0.88	80.25	4.93	5.04	1.05	14,150	14,380	6.13
55	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	0.63	18.74	70.50	0.014	10.13	1.33	80.31	4.70	2.73	1.05	14,115	14,430	6.32
56	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	1.07	17.90	73.28	0.016	7.75	0.81	80.43	4.54	3.67	1.04	14,145	14,254	6.22
57	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.76	21.04	74.98	0.013	3.22	0.65	80.43	4.54	3.67	1.04	14,145	14,254	6.22
58	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.82	21.07	76.13	0.007	1.98	0.77	80.43	4.54	3.67	1.04	14,145	14,254	6.22
59	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.70	19.63	76.67	0.021	3.60	0.74	80.43	4.54	3.67	1.04	14,145	14,254	6.22
60	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.76	20.77	64.16	0.011	14.31	0.70	80.43	4.54	3.67	1.04	14,145	14,254	6.22
61	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.25	21.29	75.17	0.019	3.29	0.84	80.43	4.54	3.67	1.04	14,145	14,254	6.22
62	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.64	19.36	75.09	0.063	4.91	0.76	80.43	4.54	3.67	1.04	14,145	14,254	6.22
63	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	0.75	16.10	78.72	0.014	4.43	0.56	86.40	4.41	3.09	1.11	15,240	15,101	11.49
64	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	1.36	16.00	78.24	0.014	4.40	0.56	85.88	4.48	3.57	1.11	15,247	15,007	10.78
65	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. R.	0.64	17.76	77.29	0.006	4.31	0.41	85.63	4.72	3.84	1.09	14,960	15,100	10.50
66	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	3.80	17.30	74.83	0.006	4.17	0.40	82.90	4.91	6.56	1.06	14,490	14,620	7.72
67	W. Va. C. Co. No. 2.	MeD.	Welch, M.	A. D.	1.05	13.07	78.61	0.004	7.27	0.75	82.82	3.96	3.99	1.21	14,540	14,220	7.35

Table of Coal Analyses by W. Va. Geological Survey.—Continued.

No. on Map II.	Mine	County	Coal Bed	Condition of Sample	PROXIMATE				Common to Both	ULTIMATE				Calorimeter B. T. U. for 1 lb. of Coal	Calculated B. T. U. for 1 lb. of Coal	Carbon Divided by Oxygen + Ash		
					Moisture	Volatile Matter	Fixed Carbon	Phosphorus		Ash.	Sulphur	Carbon	Hydrogen				Oxygen	Nitrogen
87	U. C. Co. No. 1.	MeD.	No. 4 Pocca, M. S.	A. R.	1.32	13.03	78.40	0.004	7.25	0.75	82.60	3.99	4.20	1.21	14,501	14,197	7.21	
88	U. C. Co. No. 2.	MeD.	No. 4 Pocca, M. S.	A. D.	0.75	13.33	80.05	0.005	5.87	0.57	85.04	2.93	3.63	0.96	14,981	14,549	8.95	
89	U. C. Co. No. 3.	MeD.	No. 4 Pocca, M. S.	A. R.	1.10	13.28	79.77	0.005	5.85	0.57	84.74	3.97	3.91	0.96	14,929	14,506	8.68	
90	U. C. Co. No. 4.	MeD.	No. 4 Pocca, M. S.	A. R.	1.05	15.51	78.13	0.006	5.31	0.97	83.47	4.08	5.22	0.95	14,811	14,308	7.92	
91	U. C. Co. No. 5.	MeD.	No. 4 Pocca, M. S.	A. R.	1.62	15.42	77.68	0.006	5.28	0.97	82.90	4.14	5.76	0.95	14,727	14,220	7.51	
92	U. C. Co. No. 6.	MeD.	No. 4 Pocca, M. S.	A. R.	0.60	16.52	78.45	0.004	4.43	0.53	87.17	4.43	3.47	0.97	15,110	15,253	12.63	
93	U. C. Co. No. 7.	MeD.	No. 4 Pocca, M. S.	A. R.	1.13	16.43	78.03	0.004	4.41	0.53	86.71	4.49	2.89	0.97	15,030	15,193	11.88	
94	U. C. Co. No. 8.	MeD.	No. 4 Pocca, M. S.	A. R.	1.20	16.38	78.75	0.002	3.67	0.55	86.19	3.93	4.70	0.96	15,193	14,630	10.03	
95	U. C. Co. No. 9.	MeD.	No. 4 Pocca, M. S.	A. R.	1.94	16.26	78.16	0.002	3.64	0.55	85.55	4.02	5.28	0.96	15,081	14,349	9.59	
96	U. C. Co. No. 10.	MeD.	No. 4 Pocca, M. S.	A. R.	1.35	16.63	78.53	0.003	3.49	0.63	86.33	4.17	4.42	0.96	15,332	14,827	10.91	
97	U. C. Co. No. 11.	MeD.	No. 4 Pocca, M. S.	A. R.	1.92	16.54	78.07	0.003	3.47	0.63	85.84	4.23	4.87	0.96	15,245	14,755	10.29	
98	U. C. Co. No. 12.	MeD.	No. 4 Pocca, M. S.	A. R.	1.30	16.44	79.23	0.004	3.03	0.60	87.19	4.47	3.74	0.97	15,632	15,185	12.88	
99	U. C. Co. No. 13.	MeD.	No. 4 Pocca, M. S.	A. R.	2.01	16.33	78.65	0.004	3.01	0.60	86.58	4.55	4.29	0.97	15,521	15,103	11.85	
100	U. C. Co. No. 14.	MeD.	No. 4 Pocca, M. S.	A. R.	1.25	16.05	76.54	0.007	6.16	0.66	84.85	3.94	3.45	0.93	14,791	15,548	8.82	
101	U. C. Co. No. 15.	MeD.	No. 4 Pocca, M. S.	A. R.	2.14	15.91	75.84	0.007	6.11	0.66	84.09	4.04	4.17	0.93	14,658	14,441	8.18	
102	U. C. Co. No. 16.	MeD.	No. 4 Pocca, M. S.	A. R.	1.28	18.58	75.85	0.003	4.29	0.77	86.03	4.33	2.57	0.90	15,500	15,036	10.82	
103	U. C. Co. No. 17.	MeD.	No. 4 Pocca, M. S.	A. D.	0.45	16.65	77.52	0.012	5.38	0.79	86.03	4.33	2.57	0.90	15,500	15,036	10.82	
104	U. C. Co. No. 18.	MeD.	No. 4 Pocca, M. S.	A. R.	3.32	16.17	75.28	0.012	5.23	0.77	83.55	4.65	4.95	0.87	15,054	14,682	8.32	
105	U. C. Co. No. 19.	MeD.	No. 4 Pocca, M. S.	A. D.	0.94	15.86	78.35	0.006	4.85	0.64	85.56	4.22	3.74	1.00	15,108	14,796	10.21	
106	U. C. Co. No. 20.	MeD.	No. 4 Pocca, M. S.	A. R.	1.91	15.93	77.40	0.006	4.76	0.65	84.67	4.32	4.58	1.00	14,953	14,661	9.26	
107	U. C. Co. No. 21.	MeD.	No. 4 Pocca, M. S.	A. R.	0.66	18.81	75.98	0.004	4.55	0.84	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
108	U. C. Co. No. 22.	MeD.	No. 4 Pocca, M. S.	A. R.	0.44	19.66	75.22	0.003	4.68	0.93	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
109	U. C. Co. No. 23.	MeD.	No. 4 Pocca, M. S.	A. R.	0.72	17.79	75.14	0.005	6.35	0.65	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
110	U. C. Co. No. 24.	MeD.	No. 4 Pocca, M. S.	A. R.	0.88	17.83	76.99	0.009	4.30	0.77	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
111	U. C. Co. No. 25.	MeD.	No. 4 Pocca, M. S.	A. R.	0.52	18.05	77.32	0.008	4.11	0.80	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
112	U. C. Co. No. 26.	MeD.	No. 4 Pocca, M. S.	A. R.	0.43	17.91	77.10	0.008	4.56	0.73	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
113	U. C. Co. No. 27.	MeD.	No. 4 Pocca, M. S.	A. D.	0.39	15.92	78.16	0.0065	5.53	0.56	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
114	U. C. Co. No. 28.	MeD.	No. 4 Pocca, M. S.	A. D.	0.31	16.82	76.41	0.006	6.46	0.70	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
115	U. C. Co. No. 29.	MeD.	No. 4 Pocca, M. S.	A. D.	0.23	16.81	78.61	0.009	4.35	0.70	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
116	U. C. Co. No. 30.	MeD.	No. 4 Pocca, M. S.	A. D.	0.27	16.54	76.49	0.007	6.70	0.65	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
117	U. C. Co. No. 31.	MeD.	No. 4 Pocca, M. S.	A. D.	0.23	17.47	77.80	0.055	4.50	0.62	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
118	U. C. Co. No. 32.	MeD.	No. 4 Pocca, M. S.	A. D.	0.22	16.47	78.00	0.005	5.21	0.59	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
119	U. C. Co. No. 33.	MeD.	No. 4 Pocca, M. S.	A. D.	0.14	16.73	76.58	0.0147	6.55	0.67	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
120	U. C. Co. No. 34.	MeD.	No. 4 Pocca, M. S.	A. D.	0.20	16.42	76.49	0.0038	6.89	0.59	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
121	U. C. Co. No. 35.	MeD.	No. 4 Pocca, M. S.	A. D.	0.85	17.15	76.40	0.005	5.60	0.82	85.56	4.32	4.58	1.00	14,953	14,661	9.26	
122	U. C. Co. No. 36.	MeD.	No. 4 Pocca, M. S.	A. D.	0.65	17.80	76.45	0.006	5.10	1.02	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
123	U. C. Co. No. 37.	MeD.	No. 4 Pocca, M. S.	A. R.	1.46	17.66	75.82	0.006	5.06	1.01	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
124	U. C. Co. No. 38.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
125	U. C. Co. No. 39.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
126	U. C. Co. No. 40.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
127	U. C. Co. No. 41.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
128	U. C. Co. No. 42.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
129	U. C. Co. No. 43.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
130	U. C. Co. No. 44.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
131	U. C. Co. No. 45.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
132	U. C. Co. No. 46.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
133	U. C. Co. No. 47.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
134	U. C. Co. No. 48.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
135	U. C. Co. No. 49.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
136	U. C. Co. No. 50.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
137	U. C. Co. No. 51.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
138	U. C. Co. No. 52.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
139	U. C. Co. No. 53.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
140	U. C. Co. No. 54.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
141	U. C. Co. No. 55.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
142	U. C. Co. No. 56.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
143	U. C. Co. No. 57.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
144	U. C. Co. No. 58.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
145	U. C. Co. No. 59.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
146	U. C. Co. No. 60.	MeD.	No. 4 Pocca, M. S.	A. R.	1.04	21.06	73.03	0.004	4.87	0.82	83.51	3.99	3.74	0.96	15,045	14,711	9.03	
147	U. C. Co. No. 61.	MeD.	No. 4 Pocca, M. S.															

Table of Coal Analyses by W. Va. Geological Survey.—Continued.

Mine			Coal Bed			Condition of Sample			PROXIMATE				Common to Both		ULTIMATE				Carbon Divided by Oxygen + Ash	
									Moisture	Volatile Matter	Fixed Carbon	Phosphorus			Carbon	Ash.	Sulphur	Carbon		Hydrogen	Oxygen	Nitrogen
													Calorimeter B. T. U. for 1 lb. of Coal	Calculated B. T. U. for 1 lb. of Coal						
1	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.60	14.30	79.87	0.027	5.23	0.74	85.21	4.31	3.58	0.93	15.358	14.818	9.67	
2	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	1.49	14.18	79.14	0.027	5.19	0.74	84.45	4.41	4.28	0.93	15.292	14.713	8.92	
3	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	1.35	12.99	80.10	0.009	5.56	0.74	83.16	4.73	4.88	0.93	14.682	14.680	7.96	
4	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	1.88	12.92	79.67	0.009	5.53	0.74	82.72	4.79	5.29	0.93	14.604	14.611	7.05	
5	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	1.50	15.14	78.13	0.011	5.23	0.77	84.11	4.28	4.66	0.95	14.877	14.559	8.50	
6	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	2.11	15.04	77.65	0.011	5.20	0.77	83.59	4.35	5.14	0.95	14.795	14.497	8.05	
7	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	0.85	17.78	76.67	0.012	4.70	0.73								
8	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	1.70	16.04	77.67	0.012	4.59	0.69	85.02	4.51	4.25	0.94	15.020	14.863	9.49	
9	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	2.23	15.96	77.24	0.012	4.57	0.69	84.57	4.57	4.66	0.94	14.949	14.813	9.10	
10	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	1.05	16.67	76.17	0.006	6.11	0.72	85.10	4.27	2.75	0.95	15.176	14.905	9.60	
11	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	1.60	16.58	75.74	0.006	6.08	0.72	84.68	4.43	3.16	0.95	15.093	14.849	9.16	
12	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.65	16.35	79.65	0.011	3.33	0.60	87.19	4.30	3.62	0.94	15.371	15.093	12.51	
13	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	1.72	16.18	78.78	0.011	3.32	0.60	86.26	4.42	4.46	0.94	15.207	14.963	11.09	
14	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	0.86	22.96	71.59	0.005	4.59	0.80								
15	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	0.85	23.95	71.07	0.003	4.13	0.65								
16	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.														
17	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.														
18	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.27	15.73	79.80	0.0045	4.20	0.61				15.413				
19	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.13	15.82	79.34	0.005	4.71	0.72				15.251				
20	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.12	15.70	79.40	0.0045	4.78	0.64				15.141				
21	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.24	16.06	77.87	0.0045	5.83	0.53				15.025				
22	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.26	17.45	76.93	0.005	5.36	0.55				15.386				
23	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.15	17.37	76.86	0.003	5.62	0.47				14.934				
24	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.30	17.25	78.85	0.012	3.60	0.67				15.344				
25	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.36	17.02	78.22	0.004	4.40	0.54				15.261				
26	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.41	18.21	76.38	0.005	5.00	0.50				15.249				
27	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.19	17.03	78.40	0.0025	4.88	0.54				15.337				
28	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.21	16.95	79.12	0.005	4.42	0.78				15.121				
29	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.21	15.67	78.99	0.005	5.13	0.57				15.140				
30	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.30	18.03	77.77	0.003	3.90	0.53				15.307				
31	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.34	17.97	77.74	0.004	4.95	0.61				15.059				
32	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.42	18.29	77.02	0.003	4.27	0.64				15.240				
33	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.26	16.55	80.01	0.0025	3.18	0.54				15.375				
34	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.19	17.15	77.00	0.0035	5.66	0.53				14.984				
35	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.32	16.42	79.88	0.0022	3.38	0.56				15.376				
36	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.18	17.36	80.12	0.002	2.34	0.53				15.543				
37	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.23	19.03	77.71	0.0025	3.03	0.54				15.486				
38	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.31	19.13	77.21	0.002	3.35	0.48				14.935				
39	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. D.	0.32	18.27	77.78	0.002	3.63	0.55				15.229				
40	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	0.42	16.77	78.01	0.007	4.80	0.63	84.95	4.34	3.91	0.94	15.143	14.750	9.57	
41	W. Va. Co. (Red)	Med.	No. 3	Poca.	M.	A. R.	1.16	17.90	76.13	0.008	*4.81	0.76	84.67	4.42	4.88	0.94	14.957	14.703	9.00	
Average																				

Table Showing Location of Mines Sampled by West Virginia Geological Survey Listed in Preceding Table.

No. on Map II	Sample Number.	Location of Mine.	Page of this Report	Other Report References
1	868H	*Oceana, 2.3 mi. N. W.	385	
2	82G	*Oceana, 1.5 mi. N. W.	391	
3	87G	*Toney Fork, 3.5 mi. N.	392	
4	871Ha	*Clear Fork Gap.	410	
5	84G	*Toney Fork, 0.6 mi. N. E.	415	
6	85G	*Crary, 1.2 mi. N. W.	416	
7	874H	*Crary, 0.5 mi. N. W.	416	
8		Mohawk, 0.2 mi. N.	420-1	II(A) 328-9
9	137G	Panther, 0.4 mi. N. W.	421	
10	152G	Douglas, 0.8 mi. E.	421	
11	86G	*Swope, 1.0 mi. S.	429	
12	870H	*Crary, 1.0 mi. W.	435	
13	871H	*Crary, 1.2 mi. S.	453	
14	83G	*Jesse, 0.5 mi. N. W.	460	
15	869H	*Crary, 2.0 mi. S. W.	459	
16	872H	*Knob Fork School.	471	
17	91G	*Uno, 0.5 mi. N. E.	473	
18	876H	*Hanover, 0.5 mi. W.	476	
19	877H	*Jaeger, 2.0 mi. N.	92, 483	
20	873H	*Crary, 2.0 mi. N. E.	488	
21	875H	*Baileysville, 0.5 mi. N. E.	491	
22	90G	*Hanover, 3.4 mi. S. E.	495	
23	88G	*McGraw, 2.2 mi. S. E.	490	
24	151G	Douglas.	499	
25	159G	Iaeger, 1.5 mi. S.	503	
26	93G	*Saulsville, 0.9 mi. S. E.	525	
27	883H	*Iaeger, 0.1 mi. S. W.	529	
28	92G	*Fanny, 1.2 mi. E.	553	
29	89G	*McGraw, 1.7 mi. S. W.	544	
30	878H	*Bartley, 1.5 mi. S. E.	545	
31	880H	*Pineville, 2.0 mi. N. 10° E.	547	
32	98G	*Bud, 1.7 mi. S. W.	539, 556	
33		Roderfield, 0.3 mi. N. E.	560	II p. 666-7
34		Big Sandy.	560	do
35		Hensley, 0.5 mi. W.	560	II(A) p. 250
36		Marytown, 0.2 mi. S. E.	560	II p. 666-7
37		Marytown, 0.5 mi. N. E.	560	II(A) p. 249.
38		Marytown, 0.9 mi. N.	560	do
39		Twin Branch, 0.6 mi. N.	560	II(A) p. 248-9
40		Twin Branch Sta., 0.2 mi. N. E.	560	II p. 666-7
41		Davy, 0.1 mi. S.	560	II(A) p. 247-8
42		Davy, 0.5 mi. N. E.	560	II(A) p. 248
43	108G	Davy, 0.6 mi. N. E.	303, 561	
44	109G	Davy, 1.5 mi. N.	561	
45		Pando, 0.3 mi. S.	560	II p. 666-7
46		Deegans, 0.5 mi. S. W.	560	II. (A) p. 247
47	149G	Erin, 0.5 mi. S. E.	562	
48	148G	Erin, 0.8 mi. S. E.	562	

No. of Map	Sample Number.	Location of Mine.	Page of this Report	Other Report
49	104G	Premier, 0.3 mi. S. W.....	563	
50	133G	Coalwood, 1.7 mi. N. E.....	567	
51	131G	Coalwood, 2.1 mi. S. E.....	567	
52	153G	Bartley.....	568	
53	158G	Ritter, 0.9 mi. S. E.....	578	
54	156G	Lex, south side of Dry Fork	580	
55	155G	Lex, north side of Dry Fork	580	
56	154G	Lex, 0.5 mi. S. E.....	581	
57		Deegans, 0.5 mi. S. W.....	583	II(A) p. 243
58	107G	Antler, 1.2 mi. S.....	584	
59		Hemphill, 0.5 mi. S. W.....	583	II(A) p. 243.
60		Hemphill, 0.7 mi. N. E.....	583	II(A) p. 242
61		Welch, 0.6 mi. N. W.....	583	do
62	106G	Premier, 0.4 mi. W.....	585	
63	105G	Premier, 0.3 mi. S. W.....	585	
64	102G	Premier, 0.3 mi. N. E.....	586	
65	103G	Premier, 0.7 mi. S. E.....	586	
66		Coalwood, 0.8 mi. N. W....	583	II(A) p. 244
67	884H	*English, 1.6 mi. W.....	203	
68	879H	*Pineville, 1.3 mi. N. E.....	597	
69	150G	Erin, N.....	602	
70	157G	English, 0.5 mi. S. W.....	606	
71	146G	Dry Fork, 0.5 mi. W.....	606	
72	144G	Dry Fork, N.....	607	
73	145G	Dry Fork, S.....	607	
74		Yukon, 0.4 mi. S. W.....	208, 611	II(A) p. 197
75	142G	Excelsior.....	608	
76	141G	War, 1.0 mi. S. W.....	609	
77	139G	War, 0.1 mi. N.....	308, 626	
78	882H	*Maben, 0.1 mi. W.....	618	
79	101G	*Kimball, 2.2 mi. N.....	625	
80	881H	*Pierpont, 0.3 mi. N. E.....	630	
81	99G	*Crumpler, 0.5 mi. N.....	647	
82	97G	*Basin, 0.5 mi. S. W.....	653	
83	100G	*Crumpler, 1.5 mi. N.....	655	
84		Olmsted, 0.5 mi. S. E.....	668	II(A) p. 159, 160
85	124G	Kimball, 1.0 mi. N.....	668	
86	130G	Coalwood, 0.8 mi. S. E....	670	
87		Wilcoe, 0.4 mi. N. E.....	673	II(A) p. 160
88		Gary, 0.5 mi. W.....	673	II(A) p. 161
89		Gary, 0.9 mi. N. E.....	673	do
90		Ream, 0.4 mi. W.....	673	II(A) p. 162
91		Elbert, 0.3 mi. N. W.....	673	II(A) p. 162-3
92		Elbert, 0.5 mi. S. E.....	673	II(A) p. 163
93		Filbert.....	673	II(A) p. 163-4
94		Gary, 1.5 mi. E.....	673	II(A) p. 162
95	135G	Thorpe, 0.5 mi. N. W.....	674	
96		Black Wolf, 0.6 mi. S. W...	673	II(A) p. 165
97	96G	Mullens, 1.3 mi. S. W.....	678	
98	95G	Mullens, 1.0 mi. N.....	679	
99	94G	Mullens, 2.3 mi. N. E.....	679	
100	128G	Olmsted, 0.5 mi. S. E.....	690	
101	126G	Big Four	691	

No. of Map II	Sample Number.	Location of Mine.	Page of this Report	Other Report
102	125G	Kimball, 1.0 mi. N.....	691	
103		Vivian.....	690	Bull. 2, p. 211-12
104		Vivian, 0.4 mi. E.....	690	do
105		East Vivian.....	690	do
106		East Vivian, 0.5 mi. S. E..	690	do
107		Eckman, 0.3 mi. W.....	690	do
108		Eckman, 0.3 mi. S. E.....	690	do
109		Eckman, 0.7 mi. S. W.....	690	do
110		Keystone, 0.4 mi. N. W....	690	do
111		Berwind, 1.0 mi. S. E.....	698	II(A) p. 154
112		Canebrake, 0.2 mi. W.....	698	do
113	123G	Hartwell, 0.8 mi. N.....	699	
114	122G	Hartwell, 0.8 mi. W.....	699	
115		Havaco (Jed)	700	II(A) p. 151
116		Wilcoe, 0.4 mi. N. E.....	700	do
117		Gary, 1.5 mi. E.....	700	II(A) p. 152
118	136G	Thorpe, 0.5 mi. N. W.....	701	
119		Thorpe, 0.9 mi. N. E.....	700	II(A) p. 152
120		Thorpe, 1.1 mi. S. E.....	700	do
121		Pageton Sta., 1.0 mi. N.W..	700	II(A) p. 153
122	115G	O'Toole, 0.3 mi. S. W.....	701	
123	114G	Jenkinjones, 1.2 mi. S. W..	706	
124	112G	Jenkinjones, 0.7 mi. S.....	706	
125	113G	Jenkinjones, 0.6 mi. S. E..	707	
126		North Fork Sta., 0.7 mi. E..	709	Bull. 2, p. 211-12
127		Gilliam, 0.3 mi. N.W.....	709	do
128		Gilliam, 0.1 mi. N.....	709	do
129		Rolfe, 0.1 mi. N.....	709	do
130		Bearwal'w Sta., 0.9 mi. N.E.	709	do
131		Bearwal'w Sta., 0.4 mi. S.E.	709	do
132		Bearwal'w Sta., 0.9 mi. S.E.	709	do
133		McDowell, 0.1 mi. S.E.....	709	do
134		Ashland, 0.3 mi. N.E.....	710	do
135		McDowell, 1.0 mi. S.E.....	710	do
136		Kyle, 0.3 mi. S.W.....	710	do
137		Kyle, 0.7 mi. E.....	710	do
138		Upland, 0.2 mi. S.....	710	do
139		Elkhorn, 0.6 mi. S.W.....	710	do
140		Elkhorn	710	do
141		Ennis	710	do
142		Ennis, 0.3 mi. S.W.....	710	do
143		Ennis, 0.7 mi. E.....	710	do
144		Ennis, 0.8 mi. S.E.....	710	do
145		Maybeury, 0.6 mi. S.E.....	225, 710	do
146		Maybeury, 1.2 mi. E.....	710	do
147		Maybeury, 1.2 mi. E.....	710	do

The following table contains chemical analyses and calorific results determined for coal from 57 different mines within the territory of this Report by the U. S. Geological Survey and the U. S. Bureau of Mines. It is followed immediately by another, giving the number of the mine on Map II; the accurate location of the mine; and page references to its description.

Table of Coal Analyses by U. S. Geological Survey, McDowell County.

No. on Map II	Mine	Coal Bed	Average Thickness of Coal.	No. of Samples Mixed to make Sample	Condition of Sample	PROXIMATE				Common to Both	ULTIMATE				Calorimeter B. T. U. for 1 lb. of Coal	Calculated B. T. U. for 1 lb. of Coal	Carbon Divided by Oxygen + Ash	
						Moisture	Volatile Matter	Fixed Carbon	Ash		Sulphur	Hydrogen	Carbon	Nitrogen				Oxygen
26	Seaboard Coal Co. (Tug River).	Sewell, M. S.	3.5	4	A. D.	0.80	15.50	80.40	3.29	0.62	4.41	86.73	1.42	3.53	15,210	14,700	12.71	
27	Seaboard Coal Co. (Tug River).	Sewell, M. S.	3.5	4	A. R.	3.50	15.00	78.30	3.20	0.60	4.59	84.39	1.38	5.84	14,800	14,700	9.33	
37	F. E. E. Coal Co. No. 2.	Sewell, M. S.	2.75	4	A. D.	0.80	16.00	80.10	3.05	0.72	4.62	87.46	1.40	2.75	15,320	.....	15.01
27	F. E. E. Coal Co. No. 3.	Sewell, M. S.	2.75	4	A. R.	3.00	15.50	78.50	2.98	0.70	4.76	85.54	1.37	4.65	14,980	15,060	11.21	
40	F. E. E. Coal Co. (Twin Branch).	Sewell, M. S.	3.25	3	A. D.	0.70	14.00	79.10	3.69	0.71	4.43	86.28	1.34	3.55	15,160	.....	11.81
40	F. E. E. Coal Co. (Twin Branch).	Sewell, M. S.	3.25	3	A. R.	3.40	16.00	77.00	3.59	0.69	4.61	83.95	1.30	3.56	14,750	14,650	8.88	
42	Superior Poca. C. Co. No. 2 ^{1/2} .	Sewell, M. S.	3.0	3	A. D.	0.80	14.50	80.35	4.35	0.67	4.53	85.23	1.35	3.87	14,900	.....	10.36
42	Superior Poca. C. Co. No. 2 ^{1/2} .	Sewell, M. S.	3.0	3	A. R.	3.60	14.50	77.70	4.23	0.65	4.71	82.84	1.31	3.26	14,570	14,510	7.89	
43	Superior Poca. C. Co. (Helena) No. 3.	Sewell, M. S.	2.75	2	A. D.	0.80	13.50	82.20	3.54	0.57	4.50	86.59	1.48	3.32	15,290	.....	12.62
43	Superior Poca. C. Co. (Helena) No. 3.	Sewell, M. S.	2.75	2	A. R.	3.90	13.50	79.20	3.43	0.55	4.70	83.91	1.43	5.98	14,740	14,680	8.91	
148	Superior Poca. C. Co. (Cletus) No. 4.	Sewell, M. S.	.....	2	A. R.	3.90	14.50	78.20	3.39	0.62	4.73	83.62	1.27	6.36	14,700	.....	8.58
	Average	Sewell, M. S.	.....	.....	A. D.	0.78	15.20	80.43	3.59	0.66	4.56	86.45	1.40	3.40	15,180	.....	12.37
	Average	Sewell, M. S.	.....	.....	A. R.	3.55	14.83	78.15	3.47	0.64	4.68	84.04	1.34	5.83	14,757	14,720	9.03
60	Carter C. Co. No. 1.	Welch, M. S.	4.5	3	A. D.	0.60	14.14	76.47	8.79	0.58	4.34	82.00	1.21	3.08	14,222	.....	6.91
60	Carter C. Co. No. 1.	Welch, M. S.	4.5	3	A. R.	2.19	13.91	75.25	8.65	0.57	4.45	80.69	1.19	4.45	13,995	14,171	6.16	
149	Oregon C. Co. No. 3.	Welch, M. S.	3.6	1	A. R.	2.54	20.79	79.21	.....	0.72	.....	.....	.....	.....	.....	.....	.....
149	Oregon C. Co. No. 2.	Welch, M. S.	3.1	1	A. R.	2.41	20.75	79.25	.....	0.57	.....	.....	.....	.....	.....	.....	.....
151	Carter C. Co. No. 2.	Welch, M. S.	3.3	3	A. D.	0.80	13.92	76.35	8.93	0.55	4.20	81.20	1.24	3.88	14,168	.....	6.34
151	Carter C. Co. No. 2.	Welch, M. S.	3.3	3	A. R.	2.29	13.71	75.20	8.80	0.54	4.31	79.98	1.22	5.15	13,955	13,900	5.73	
152	Carter C. Co. No. 4.	Welch, M. S.	4.0	3	A. D.	0.81	13.25	78.48	7.46	0.53	4.28	82.61	1.33	3.79	14,432	.....	7.24
152	Carter C. Co. No. 4.	Welch, M. S.	4.0	3	A. R.	2.40	13.04	77.22	7.34	0.52	4.39	81.29	1.31	5.15	14,202	14,170	6.51	
	Average	Welch, M. S.	.....	.....	A. D.	0.74	13.77	77.10	8.39	0.55	4.27	81.94	1.26	3.59	14,277	.....	6.84
	Average	Welch, M. S.	.....	.....	A. R.	2.29	13.55	75.89	8.27	0.54	4.38	80.65	1.24	4.92	14,051	14,080	6.11
153	Davy Poca. C. Co. No. 1.	Beckley, M. S.	6.0	3	A. R.	2.32	16.76	69.80	11.12	1.78	4.35	77.46	1.27	4.92	13,514	.....	5.11
154	Carter C. Co. (Caretta) No. 5.	Beckley, M. S.	4.1	3	A. R.	2.35	12.36	74.55	10.74	0.59	4.25	78.31	1.17	4.94	13,642	.....	5.00
155	Johns Branch C. Co.	Beckley, M. S.	4.1	4	A. R.	2.24	17.29	71.59	8.88	0.64	4.34	80.36	1.29	4.49	13,952	.....	6.01
156	War Creek C. Co.	Beckley, M. S.	3.5	3	A. R.	2.18	16.36	73.02	8.44	0.69	4.20	80.70	1.44	4.53	14,006	.....	6.22
	Average	Beckley, M. S.	.....	.....	A. R.	2.27	15.69	72.24	9.80	0.92	4.29	79.21	1.29	4.49	13,778	.....	5.54
54	Lake Superior C. Co. (North)	No. 4 Poca. M. S.	4.0	4	A. D.	0.80	13.50	80.20	4.79	0.55	4.36	85.91	1.19	3.20	14,900	.....	10.75
54	Lake Superior C. Co. (North)	No. 4 Poca. M. S.	4.0	4	A. R.	2.70	13.50	79.10	4.69	0.54	4.49	84.19	1.17	4.92	14,690	14,670	8.76	
157	Houston C. & C. Co. (Hugar Shaft)	No. 4 Poca. M. S.	5.5	3	A. D.	1.55	13.00	74.52	5.93	0.61	4.38	83.70	1.32	4.06	14,508	.....	8.38
158	Lake Superior C. Co. (South)	No. 4 Poca. M. S.	4.2	3	A. D.	0.50	13.50	81.70	4.32	0.59	4.39	86.33	1.17	3.20	15,040	.....	11.48
158	Lake Superior C. Co. (South)	No. 4 Poca. M. S.	4.2	3	A. R.	2.80	13.50	79.50	4.22	0.58	4.42	84.34	1.14	5.17	14,700	14,710	8.98	
	Average	No. 4 Poca. M. S.	.....	.....	A. D.	0.65	13.50	81.30	4.55	0.57	4.38	86.12	1.18	3.20	15,015	.....	11.11
	Average	No. 4 Poca. M. S.	.....	.....	A. R.	2.35	15.00	77.70	4.95	0.58	4.47	84.07	1.21	4.72	14,433	14,690	8.69

Table of Coal Analyses by U. S. Geological Survey, McDowell County.—Continued.

No. on Map II.	Mine	Coal Bed	Average Thickness of Coal, Feet.	No. of Samples Mixed to make Composite Sample	Condition of Sample	PROXIMATE			Common to Both	ULTIMATE					Calorimeter B. T. U. for 1 lb. of Coal	Calculated B. T. U. for 1 lb. of Coal	Carbon Divided by Oxygen + Ash
						Moisture	Volatile Matter	Fixed Carbon		Ash	Subbur	Hydrogen	Carbon	Nitrogen	Oxygen		
103	Tidewater C. & C. Co.	No. 3 Pocah, M. S.	5.0	3	A. D.	0.60	13.00	81.50	4.86	0.05	4.33	84.46	1.16	4.54	14.910	.....	8.98
103	Tidewater C. & C. Co.	No. 3 Pocah, M. S.	5.0	3	A. R.	2.90	13.00	79.30	4.75	0.64	4.49	82.52	1.13	6.47	14.570	14,810	7.35
103	Bottom Creek C. & C. Co.	No. 3 Pocah, M. S.	5.5	3	A. D.	0.60	13.50	80.70	5.16	0.62	4.19	82.73	1.14	3.16	14.860	.....	10.30
104	Bottom Creek C. & C. Co.	No. 3 Pocah, M. S.	5.5	3	A. R.	2.70	13.00	79.20	5.05	0.61	4.3	83.93	1.12	4.96	14.550	14,530	8.38
105	Peetress C. & C. Co.	No. 3 Pocah, M. S.	5.75	3	A. D.	0.60	14.00	80.30	5.10	0.60	4.26	86.35	1.12	2.67	14.910	.....	11.26
105	Peetress C. & C. Co.	No. 3 Pocah, M. S.	5.75	3	A. R.	3.00	13.50	78.50	4.98	0.59	4.43	84.28	1.09	4.63	14.550	14,670	8.77
106	Empire C. & C. Co.	No. 3 Pocah, M. S.	6.0	3	A. D.	0.61	13.15	80.62	5.62	0.58	4.23	83.28	1.12	3.66	14.791	.....	9.14
106	Empire C. & C. Co.	No. 3 Pocah, M. S.	6.0	3	A. R.	2.50	12.90	79.09	5.51	0.60	4.37	85.64	1.11	2.98	14.510	14,350	7.71
107	Shawnee C. & C. Co.	No. 3 Pocah, M. S.	6.6	5	A. D.	0.80	13.50	80.40	5.30	0.60	4.37	85.64	1.11	2.90	14.850	.....	10.44
107	Shawnee C. & C. Co.	No. 3 Pocah, M. S.	6.6	5	A. R.	3.30	13.50	78.00	4.83	0.63	4.30	83.95	1.16	5.04	14.880	14,590	8.17
108	Pulaski Iron Co. No. 1.	No. 3 Pocah, M. S.	6.5	2	A. D.	0.90	14.00	80.30	4.73	0.62	4.44	84.15	1.11	4.95	14.610	14,630	8.69
108	Pulaski Iron Co. No. 1.	No. 3 Pocah, M. S.	6.5	2	A. R.	3.00	13.50	78.50	5.31	0.60	4.36	85.72	1.17	2.84	14.810	14,440	10.57
109	Eureka C. & C. Co.	No. 3 Pocah, M. S.	6.75	4	A. D.	0.70	14.50	79.60	5.12	0.58	4.60	82.62	1.13	5.94	14.930	.....	7.47
109	Eureka C. & C. Co.	No. 3 Pocah, M. S.	6.75	4	A. R.	4.30	14.00	76.60	5.29	0.63	4.98	85.31	1.05	5.34	14.830	.....	9.77
110	Keystone C. & C. Co.	No. 3 Pocah, M. S.	5.75	2	A. D.	0.70	13.50	80.50	5.18	0.62	4.32	83.52	1.08	5.23	14.510	14,510	8.02
110	Keystone C. & C. Co.	No. 3 Pocah, M. S.	5.75	2	A. R.	2.80	13.50	78.50	5.04	0.84	4.24	85.40	1.06	4.38	14.760	.....	10.12
115	N. R. & Pocah. Con. C. & C. Co. (Jed)	No. 3 Pocah, M. S.	4.8	4	A. D.	0.50	12.10	81.50	6.04	0.82	4.40	83.44	1.06	4.38	14.410	14,560	8.11
115	N. R. & Pocah. Con. C. & C. Co. (Jed)	No. 3 Pocah, M. S.	4.8	4	A. R.	2.80	11.50	79.80	5.90	0.66	4.36	87.07	1.19	5.32	15.170	.....	12.96
121	Page C. & C. Co.	No. 3 Pocah, M. S.	7.3	3	A. D.	0.60	14.00	82.20	3.20	0.64	4.54	84.72	1.16	3.83	14.760	14,710	9.48
121	Page C. & C. Co.	No. 3 Pocah, M. S.	7.3	3	A. R.	3.30	13.50	80.10	3.10	0.54	4.53	86.45	1.10	3.04	14.944	.....	11.71
126	Elk Ridge C. & C. Co.	No. 3 Pocah, M. S.	6.2	5	A. D.	0.82	13.70	81.14	4.34	0.54	4.33	84.46	1.07	5.01	14.600	14,823	9.13
126	Elk Ridge C. & C. Co.	No. 3 Pocah, M. S.	6.2	5	A. R.	3.10	13.38	79.28	4.24	0.53	4.69	84.46	1.10	2.80	14.737	.....	9.48
127	Algoma C. & C. Co. (Jiney)	No. 3 Pocah, M. S.	5.5	3	A. D.	0.71	12.95	80.19	6.15	0.51	4.58	84.86	1.07	4.78	14.338	14,641	7.69
127	Algoma C. & C. Co. (Jiney)	No. 3 Pocah, M. S.	5.5	3	A. R.	2.99	12.65	78.35	6.01	0.50	4.73	82.91	1.07	4.03	14.830	.....	9.03
130	Indian Ridge C. & C. Co.	No. 3 Pocah, M. S.	4.7	4	A. D.	0.80	13.50	80.30	5.23	0.48	4.31	84.75	1.05	5.94	14.500	14,380	7.41
130	Indian Ridge C. & C. Co.	No. 3 Pocah, M. S.	4.7	4	A. R.	3.00	13.00	78.80	5.23	0.48	4.46	82.84	1.05	5.94	14.500	14,380	7.41
131	Roanoke C. & C. Co.	No. 3 Pocah, M. S.	4.7	2	A. D.	0.70	14.00	81.00	4.29	0.47	4.37	84.91	1.13	4.82	14.980	.....	9.32
131	Roanoke C. & C. Co.	No. 3 Pocah, M. S.	4.7	2	A. R.	3.00	13.50	79.30	4.19	0.48	4.54	82.87	1.10	6.83	14.620	14,360	7.52
132	Arlington C. & C. Co.	No. 3 Pocah, M. S.	5.0	3	A. D.	0.90	14.00	80.20	4.74	0.46	4.39	86.06	1.11	3.14	14.900	.....	10.79
132	Arlington C. & C. Co.	No. 3 Pocah, M. S.	5.0	3	A. R.	3.60	13.50	78.30	4.70	0.45	4.58	83.65	1.08	5.54	14.400	14,600	8.17
133	McDowell C. & C. Co.	No. 3 Pocah, M. S.	5.0	3	A. D.	0.60	15.48	79.64	4.28	0.46	4.43	86.33	1.11	3.89	14.951	.....	11.95
133	McDowell C. & C. Co.	No. 3 Pocah, M. S.	5.0	3	A. R.	3.28	15.06	77.50	4.16	0.45	4.61	84.00	1.08	5.70	14.548	14,654	8.53
134	Ashland C. & C. Co.	No. 3 Pocah, M. S.	4.6	7	A. D.	0.60	14.50	79.40	5.45	0.65	4.42	85.27	1.05	2.16	14.880	.....	9.00
134	Ashland C. & C. Co.	No. 3 Pocah, M. S.	4.6	7	A. R.	2.80	14.50	77.40	5.33	0.64	4.56	82.39	1.03	5.05	14.550	14,500	8.03
136	Lynchburg C. & C. Co.	No. 3 Pocah, M. S.	7.3	4	A. D.	0.80	14.50	86.10	4.64	0.55	4.28	85.23	1.16	4.04	14.980	.....	9.82
136	Lynchburg C. & C. Co.	No. 3 Pocah, M. S.	7.3	4	A. R.	3.30	14.00	78.20	4.52	0.54	4.55	83.18	1.13	6.16	14.600	14,450	7.78
137	Powhatan C. & C. Co.	No. 3 Pocah, M. S.	6.2	4	A. D.	0.80	14.50	80.10	4.60	0.56	4.53	86.28	1.10	2.91	15.000	.....	11.48
137	Powhatan C. & C. Co.	No. 3 Pocah, M. S.	6.2	4	A. R.	3.30	14.50	77.70	4.49	0.55	4.72	84.12	1.07	5.05	14.630	14,790	8.82

Table of Coal Analyses by U. S. Geological Survey, McDowell County.—Continued.

Loc. on Map II.	Mine	Coal Bed	No.	Spec.	Average Thickness of Coal, Feet.	No. of Samples Mixed to make Composite Sample	Condition of Sample	PROXIMATE			Common to Both	ULTIMATE				Calorimeter B. T. U. for 1 lb. of Coal	Calculated B. T. U. for 1 lb. of Coal	Carbon Divided by Oxygen + Ash			
								Moisture	Volatile Matter	Fixed Carbon		Ash	Sulphur	Hydrogen					Nitrogen	Oxygen	
138	Unfaded	Co.	No. 3	Poca., M.	7.2	5	A. D.	0.76	13.47	81.02	4.75	0.50	4.64	86.11	1.13	2.87	14,972	14,818	11.30		
139	Unfaded	Co.	No. 3	Poca., M.	7.2	5	A. R.	3.24	13.13	79.00	4.63	0.49	4.80	83.96	1.01	5.02	14,598	14,818	8.71		
140	Unfaded	Co.	No. 3	Poca., M.	7.2	6	A. R.	0.58	14.96	79.94	4.52	0.55	4.58	86.07	1.10	3.18	14,980	14,818	11.18		
141	Unfaded	Co.	No. 3	Poca., M.	7.2	6	A. D.	3.16	14.57	77.87	4.40	0.54	4.75	83.83	1.07	5.41	14,591	14,738	8.53		
142	Unfaded	Co.	No. 3	Poca., M.	6.7	6	A. D.	0.67	14.85	80.13	4.35	0.49	4.48	86.29	1.15	3.24	14,960	14,738	11.37		
143	Unfaded	Co.	No. 3	Poca., M.	6.7	6	A. R.	3.25	14.46	78.05	4.24	0.48	4.65	84.05	1.12	5.46	14,571	14,706	8.66		
144	Unfaded	Co.	No. 3	Poca., M.	7.7	3	A. D.	0.90	13.50	81.40	4.17	0.50	4.53	86.59	1.05	3.16	15,050	14,706	11.81		
145	Unfaded	Co.	No. 3	Poca., M.	7.7	3	A. R.	3.60	13.00	79.30	4.06	0.49	4.71	84.25	1.02	5.47	14,650	14,770	8.84		
146	Unfaded	Co.	No. 3	Poca., M.	7.0	6	A. D.	0.80	15.00	80.00	4.24	0.54	4.46	86.32	1.18	3.26	15,000	14,770	11.51		
147	Unfaded	Co.	No. 3	Poca., M.	7.0	6	A. R.	4.10	14.50	77.30	4.10	0.52	4.68	83.47	1.14	6.09	14,510	14,590	8.19		
148	Unfaded	Co.	No. 3	Poca., M.	7.5	2	A. D.	0.52	14.38	81.09	4.01	0.52	4.64	86.85	1.18	2.80	15,100	14,590	12.76		
149	Unfaded	Co.	No. 3	Poca., M.	7.5	2	A. R.	3.66	13.93	78.58	3.89	0.50	4.84	84.16	1.14	5.47	14,632	14,841	8.99		
150	Unfaded	Co.	No. 3	Poca., M.	6.6	1	A. D.	0.47	14.80	81.59	3.14	0.52	4.87	87.04	1.26	3.17	15,205	14,841	13.79		
151	Unfaded	Co.	No. 3	Poca., M.	6.6	1	A. R.	2.96	14.43	79.55	3.06	0.51	5.03	84.86	1.23	5.31	14,825	15,073	10.14		
152	Unfaded	Co.	No. 3	Poca., M.	6.5	5	A. D.	0.58	14.97	80.37	4.08	0.56	4.58	86.97	1.05	2.76	15,107	14,771	12.71		
153	Unfaded	Co.	No. 3	Poca., M.	5.5	5	A. R.	3.26	14.57	78.20	3.57	0.54	4.76	84.62	1.02	5.09	14,699	14,884	9.34		
154	Unfaded	Co.	No. 3	Poca., M.	5.5	5	A. R.	2.36	15.48	75.16	7.00	1.00	.....	.....	.....	14,209	.....	.....	
155	Unfaded	Co.	No. 3	Poca., M.	4.9	1	A. R.	0.60	12.50	82.00	4.40	0.66	4.36	85.00	1.20	4.27	14,636	.....	9.68	
156	Unfaded	Co.	No. 3	Poca., M.	5.4	4	A. D.	0.70	14.00	80.10	5.90	0.57	4.27	85.94	1.15	2.87	14,656	.....	10.64	
157	Unfaded	Co.	No. 3	Poca., M.	5.2	4	A. R.	2.50	13.50	78.90	5.11	0.56	4.39	84.39	1.13	4.42	14,580	14,680	8.85		
158	Unfaded	Co.	No. 3	Poca., M.	5.2	4	A. R.	0.70	13.50	81.60	4.23	0.59	4.31	86.33	1.18	3.36	15,030	14,680	11.38		
159	Unfaded	Co.	No. 3	Poca., M.	5.75	2	A. D.	3.20	13.00	79.70	4.12	0.58	4.48	84.17	1.15	5.50	14,650	14,620	8.75		
160	Unfaded	Co.	No. 3	Poca., M.	7.5	3	A. D.	0.60	13.00	82.00	4.40	0.68	4.34	86.39	1.15	5.04	14,940	14,620	11.61		
161	Unfaded	Co.	No. 3	Poca., M.	7.5	3	A. R.	3.70	12.50	79.50	4.26	0.66	4.55	83.71	1.11	5.71	14,480	14,580	8.39		
162	Unfaded	Co.	No. 3	Poca., M.	6.75	3	A. D.	0.70	13.50	81.60	4.24	0.63	4.41	85.95	1.17	3.60	15,050	14,580	10.96		
163	Unfaded	Co.	No. 3	Poca., M.	6.75	3	A. R.	3.60	13.00	79.30	4.12	0.61	4.60	83.46	1.14	6.07	14,710	14,550	8.19		
164	Unfaded	Co.	No. 3	Poca., M.	7.4	2	A. R.	4.00	15.00	77.70	3.25	0.61	4.70	84.29	1.14	6.81	14,600	14,550	9.10		
165	Unfaded	Co.	No. 3	Poca., M.	7.4	2	A. R.	3.81	18.27	74.70	3.22	0.54	4.73	84.48	1.22	5.81	14,620	14,550	9.36		
166	Unfaded	Co.	No. 3	Poca., M.	7.6	5	A. R.	4.24	18.60	73.94	3.22	0.52	4.76	83.32	1.22	6.96	14,620	14,550	8.18		
167	Unfaded	Co.	No. 3	Poca., M.	7.8	5	A. R.	0.70	15.00	79.90	4.43	0.51	4.36	86.13	1.12	3.45	15,000	14,580	10.93		
168	Unfaded	Co.	No. 3	Poca., M.	4.0	4	A. D.	3.50	14.50	77.70	4.31	0.50	4.55	83.72	1.09	5.83	14,580	14,570	8.25		
169	Unfaded	Co.	No. 3	Poca., M.	4.6	4	A. R.	0.70	13.00	82.50	3.76	0.52	4.42	87.42	1.16	2.71	15,120	14,570	13.51		
170	Unfaded	Co.	No. 3	Poca., M.	4.6	3	A. R.	3.20	12.50	80.60	3.67	0.51	4.40	85.23	1.13	4.86	14,740	14,890	9.99		
171	Unfaded	Co.	No. 3	Poca., M.	7.6	3	A. D.	0.72	14.15	80.23	4.90	0.57	4.39	85.83	1.08	3.23	14,495	14,800	10.56		
172	Unfaded	Co.	No. 3	Poca., M.	7.6	3	A. R.	3.80	13.71	77.74	4.75	0.55	4.41	85.96	1.05	5.89	14,452	14,067	7.81		
173	Unfaded	Co.	No. 3	Poca., M.	.....	.....	A. D.	0.69	13.93	80.68	4.73	0.57	4.41	85.96	1.13	3.21	14,950	14,612	10.82
174	Unfaded	Co.	No. 3	Poca., M.	.....	.....	A. R.	3.26	13.95	78.33	4.45	0.56	4.59	83.83	1.11	5.46	14,590	14,612	8.46

Table Showing Location of Mines Sampled by U. S. Geological Survey Listed in Preceding Table.

No. on Map II.	Location of Mine.	Page of this Report	Other Reports—Bull. 2=W. Va. G. S. Bull. 22 and 85=U. S. B. M. References.
Sewell Coal:			
36	Marytown, 0.2 mi. S.E.....	560	Bull. 2, p. 245, No. 37
37	Marytown, 0.4 mi. N.E.....	560	Bull. 2, p. 245, No. 40
40	Twin Branch Sta., 0.2 mi. N.E..	560	Bull. 2, p. 244, No. 17
42	Davy, 0.5 mi. N.E.....	560	Bull. 2, p. 245, No. 42
43	Davy, 0.5 mi. N.E.....	303, 561	Bull. 2, p. 245, No. 41
148	Davy, 1.3 mi. S.E.....	563	Bull. 22, p. 253-4
Welch Coal:			
66	Coalwood, 0.8 mi. N.W.....	583	Bull. 2, p. 237, No. 66
149	Hemphill, 0.9 mi. S.W.....	583	Bull. 85, p. 120
150	Hemphill, 0.8 mi. S.W.....		Bull. 85, p. 120
151	Coalwood, 0.5 mi. W.....	583, 4	Bull. 2, p. 237, No. 31
152	Coalwood, 0.9 mi. N.E.....	583	Bull. 2, p. 237, No. 32
Beckley Coal:			
153	Erin, south.....	603	Bull. 85, p. 117
154	Caretta, 0.3 mi. S.E.....	609	Bull. 2, p. 236, No. 18
155	War, 0.8 mi. N.E.....	610	Bull. 85, p. 119
156	War, 0.1 mi. S.....	610	Bull. 85, p. 119
No. 4 Pocahontas Coal:			
84	Olmsted, 0.5 mi. S.E.....	668	Bull. 2, p. 235, No. 2
157	Olmsted	667, 8	Bull. 85, p. 115
158	Olmsted, 0.7 mi. S.E.....	668	Bull. 2, p. 235, No. 1
No. 3 Pocahontas Coal:			
103	Vivian	690	Bull. 2, p. 216, No. 61
104	Vivian, 0.4 mi. E.....	690	Bull. 2, p. 216, No. 53
105	East Vivian.....	690	Bull. 2, p. 215, No. 29
106	East Vivian, 0.5 mi. S.E.....	690	Bull. 2, p. 214, No. 14
107	Eckman, 0.3 mi. W.....	690	Bull. 2, p. 215, No. 35
108	Eckman, 0.3 mi. S.E.....	690	Bull. 2, p. 215, No. 33
109	Eckman, 0.7 mi. S.W.....	690	Bull. 2, p. 214, No. 15
110	Keystone, 0.4 mi. N.W.....	690	Bull. 2, p. 216, No. 50
115	Havaco, (Jed).....	700	Bull. 2, p. 214, No. 19
121	Pageton Sta., 1.0 mi. N.W....	700	Bull. 2, p. 214, No. 26
126	North Fork Sta., 0.7 mi. E....	709	Bull. 2, p. 214, No. 13
127	Gilliam, 0.3 mi. N.W.....	709	Bull. 2, p. 215, No. 30
130	Bearwallow Sta., 0.9 mi. N.E....	709	Bull. 2, p. 214, No. 18
131	Bearwallow Sta., 0.4 mi. S.E....	709	Bull. 2, p. 216, No. 59
132	Bearwallow Sta., 0.9 mi. S.E....	709	Bull. 2, p. 215, No. 41
133	McDowell, 0.1 mi. S.E.....	709	Bull. 2, p. 214, No. 22
134	Ashland, 0.3 mi. N.E.....	709	Bull. 2, p. 215, No. 43
136	Kyle, 0.3 mi. S.W.....	710	Bull. 2, p. 216, No. 52
137	Kyle, 0.7 mi. E.....	710	Bull. 2, p. 215, No. 31
139	Elkhorn, 0.6 mi. S.W.....	710	Bull. 2, p. 215, No. 37
140	Elkhorn	710	Bull. 2, p. 216, No. 46

No. on Map II.	Location of Mine.	Page of this Report.	Other Reports—Bull.
			2=W. Va. G. S. Bull. 22 and 85=U. S. B. M. —References.
141	Ennis	710	Bull. 2, p. 217, No. 63
142	Ennis, 0.3 mi. S.W.....	710	Bull. 2, p. 214, No. 20
143	Ennis, 0.7 mi. E.....	710	Bull. 2, p. 213, No. 10
144	Ennis, 0.8 mi. S.E.....	710	Bull. 2, p. 215, No. 34
145	Maybeury, 0.6 mi. S.E.....	225, 710	Bull. 2, p. 214, No. 12
146	Maybeury, 1.2 mi. E.....	710	Bull. 2, p. 213, No. 1
159	Farm	692	Bull. 85, p. 120
160	Big Four, 0.3 mi. W.....	692	Bull. 85, p. 115
161	West Vivian Sta., 0.3 mi. N.W..	690	Bull. 2, p. 216, No. 55
162	Keystone, 1.1 mi. N.E.....	709	Bull. 2, p. 216, No. 51
163	Pageton Sta., 0.4 mi. W.....	222	Bull. 2, p. 214, No. 27
164	Pageton Sta., 1.3 mi. N.....	700	Bull. 2, p. 214, No. 28
165	Anawalt, 1.0 mi. W.....	702	Bull. 22, p. 248
166	Leckie Sta., 0.3 mi. N.....	702	Bull. 85, p. 117
167	Leckie Sta., 0.3 mi. N.E.....	700	Bull. 85, p. 117
168	Crumpler, 0.1 mi. N.E.....	709	Bull. 2, p. 217, No. 64
169	Ashland, 1.1 mi. S.E.....	709	Bull. 2, p. 213, No. 8
170	Ennis, 0.3 mi. N.W.....	710	Bull. 2, p. 216, No. 48

CHAPTER XI.

CLAY, ROAD MATERIAL, BUILDING STONE, WATER POWER AND FORESTS.

CLAYS AND ABSENCE OF CLAY INDUSTRY.

In Volume III of the State Geological Survey Reports, published in 1905, G. P. Grimsley gives a general review of clays and the clay industry in West Virginia, along with an exhaustive discussion of the origin, chemical and physical properties and classification of clays, to which reference is made for such data, as also the technology of the industry.

ABSENCE OF DEVELOPMENT.

There is not a single brick or pottery plant utilizing clays or shales in either County, although there is an almost inexhaustible supply of the latter material, along with a practically permanent and cheap source of fuel (coal). There is also a large and growing demand for building brick due to the growth of the many mining towns and villages associated with the constantly increasing coal industry, thus affording a ready home market for this commodity, should a brick plant be established within the territory under discussion. The nearest competitor to such a plant is the operation at Williamson, Mingo County, 25 miles northwestward, a description of which is given on pages 736-7 of the Logan-Mingo Report. There also promises to be a large demand in the near future for paving brick in the improvement of the public highways in both Wyoming and McDowell, and, as discussed on a subsequent page of this Chapter, it is believed that an abundance of available shale, possessing the proper chemical and physical properties for the manufacture of fair paving brick, exists, especially in the exposures of the **Mauch Chunk** beds in the latter County.

AVAILABLE CLAY.***Transported Clay.***

Transported clay of the alluvial form, as represented by the unconsolidated clays, sand beds and gravel on the flood plains and terraces along the Guyandot River and its large tributaries in Wyoming County and Tug and Dry Fork in McDowell, occurs in abundance, although the valley floors of these streams are very narrow. Since these deposits are almost entirely derived from the sandy beds of the Kanawha, New River and Pocahontas divisions of the Pottsville Series, it is probable that in many localities they run too high in silicious matter and too low in aluminous material to be successfully operated in the manufacture of brick; hence, careful investigation of this feature is in order before building any plants to utilize them. It is very probable that the percentage of sand and gravel in these clays is higher in this region than lower down the courses of these streams in Logan and Mingo Counties, since the latter, in their erosive action, should carry in suspension aluminous material a greater distance than the other ingredients mentioned.

Residual Clay.

Residual clay, derived by weathering from rocks *in situ* and not transported, occurs in such limited quantity that it may be considered negligible in reckoning the clay resources of the area.

Stratified Shale.

Stratified shales, lying between the great sandstone ledges of the different divisions of the Pottsville Series and the Mauch Chunk Series, which constitute the surface rocks, are numerous. Many of these are too silicious to be available for brick or tile manufacture, and consequently too low in alumina, but several appear to meet the necessary requirements in this respect; viz, the Eagle, Upper Jaeger, Lower Jaeger, Sandy Huff and Rift Shales, and the red shales of the Mauch Chunk Series.

These will now be discussed in descending order in the rock column.

The Eagle Shale—The Eagle Shale of the Kanawha Group, described in Chapter V, pages 159-61, and ranging in thickness from 10 to 20 feet, should be especially adapted to the manufacture of building brick or other products not requiring very high refractory qualities. The supply of this shale available at outcrop is almost inexhaustible, belonging, as it does, slightly above midway in the interval separating the Eagle and Gilbert Coal beds, the detailed outcrops of which are shown on Map II. No sample of it was collected for analysis, but in the territory of this Report it has practically the same appearance and texture as at the mouth of Grapevine Creek, Mingo County, where the analysis of a sample, as published on page 741 of the Logan-Mingo Report of the State Geological Survey, gives the following results:

	Per cent.
Silica (SiO_2).....	53.48
Ferrie Iron (Fe_2O_3).....	7.61
Alumina (Al_2O_3).....	22.09
Lime (CaO).....	0.88
Magnesia (MgO).....	1.47
Sodium (Na_2O).....	0.70
Potassium (K_2O).....	4.52
Titanium (TiO_2).....	0.42
Phosphoric Acid (P_2O_5).....	0.32
Moisture	2.23
Loss on ignition.....	6.46
Total.....	100.18

The Upper Iaeger Shale—This shale, belonging in the New River Group, and described in Chapter VI, pages 188-9, and frequently attaining a thickness of 50 to 60 feet along Tug and Dry Forks, should furnish another abundant supply of raw material, easily accessible at outcrop and possessing the proper chemical and physical characteristics for the manufacture of an excellent building brick, and probably that for paving purposes as well. A sample for analysis was collected at the outcrop of this shale along the public highway, $\frac{3}{8}$ mile northwest of Iaeger, the composition of which, as reported by Messrs. Hite and Krak under Sample No. 118G, is as follows:

	Per cent.
Silica (SiO_2).....	53.61
Ferric Iron (Fe_2O_3).....	7.60
Alumina (Al_2O_3)	22.69
Lime (CaO).....	0.79
Magnesia (MgO).....	0.15
Potassium Oxide (K_2O).....	3.74
Sodium Oxide (Na_2O).....	0.89
Titanium Oxide (TiO_2).....	0.94
Phosphoric Acid (P_2O_5).....	0.34
Moisture	2.07
Loss on ignition.....	7.35
Total.....	100.17

From a purely chemical standpoint, the above results indicate a shale adapted to the manufacture of both building and paving brick. Its outcrop close down along the valley walls of Tug Fork for 5 miles below Iaeger, on the main line of the Norfolk & Western Railway, offers convenient transportation facilities for a brick plant using the shale in this locality. In other regions, its outcrop may be readily determined, since it belongs immediately over the Iaeger Coal, the details of which are shown on Map II.

The Lower Iaeger Shale—The Lower Iaeger Shale of the New River Group, described in Chapter VI, pages 191-2, and attaining a thickness of 20 to 40 feet in the vicinity of Iaeger, McDowell County, should burn into brick adapted for both building and paving purposes, judging from its physical appearance and chemical composition. Gawthrop collected a sample for analysis and measured the following section at its outcrop along the N. & W. Ry. grade, $\frac{1}{2}$ mile northeast of Iaeger:

	Feet.
1. Concealed, with sandy shale.....	
2. Shale, brownish gray.....	7'
3. Shale, bluish gray.....	6
4. Shale, dark gray, flaggy.....	3
5. Shale, dark, gray, to railroad grade	
(985' B.).....	7
Lower Iaeger...	23

The composition of the sample from Nos. 2, 3, 4 and 5 of the above section, as reported by Messrs. Hite and Krak under Sample No. 120G, is as follows:

	Per cent.
Silica (SiO_2).....	56.67
Ferric Iron (Fe_2O_3).....	6.72
Alumina (Al_2O_3)	21.35
Lime (CaO).....	0.43
Magnesia (MgO).....	0.12
Potassium Oxide (K_2O).....	2.20
Sodium Oxide (Na_2O).....	1.94
Titanium Oxide (TiO_2).....	0.41
Phosphoric Acid (P_2O_5).....	0.89
Moisture	1.86
Loss on ignition.....	7.44
Total.....	100.03

The foregoing analysis reveals a shale of practically the same character as the Upper Iaeger, last described, and should be adapted to the same purposes. Probably the best exposure of this shale for operation, from the standpoint of development, accessibility and convenience of transportation, is that in the point immediately northwest of the mouth of Lick Branch and $\frac{3}{4}$ mile northeast of Iaeger. Away from this locality, it is rather uncertain in its development, frequently being cut out entirely by the coalescing of the Lower Iaeger and Harvey Conglomerate Sandstones.

The Sandy Huff Shale—The Sandy Huff Shale of the New River Group, described in Chapter VI, page 193, and sometimes attaining a thickness of 40 feet in McDowell County, should burn into brick adapted to both building and paving purposes, since it is very similar in both physical appearance and chemical composition to the stratum last described. Gawthrop collected a sample for analysis and measured the following section at its outcrop along the N. & W. Ry. grade, 0.6 mile southwest of the mouth of Sandy Huff Branch and 1.5 miles northeast of Iaeger:

	Feet.
1. Concealed, with shale.....	
2. Shale, brownish gray.....	10'
3. Shale, bluish gray.....	15
4. Shale, dark, flaggy.....	5
5. Shale, dark, flaggy, with streaks of sandstone to railroad grade (990' B.).....	4
Sandy Huff.....	34

The composition of the sample from Nos. 2, 3 and 4 only of the above section, as reported by Messrs. Hite and Krak under Sample No. 119, is as follows:

	Per cent.
Silica (SiO_2).....	56.16
Ferric Iron (Fe_2O_3).....	7.40
Alumina (Al_2O_3).....	20.53
Lime (CaO).....	0.65
Magnesia (MgO).....	0.14
Potassium Oxide (K_2O).....	3.53
Sodium Oxide (Na_2O).....	0.75
Titanium Oxide (TiO_2).....	0.88
Phosphoric Acid (P_2O_5).....	0.89
Moisture	1.83
Loss on ignition.....	7.23
Total.....	99.99

A large sample—about a barrel full—was collected by Gawthrop at the same point from Nos. 2, 3 and 4 only of the section, and forwarded to A. D. Williams, Chief Road Engineer, State Road Bureau, Morgantown, W. Va., for actual tests in the manufacture of brick, the results of which are given on a subsequent page of this Chapter under "Road Material."

The Rift Shale.—The Rift Shale of the Pocahontas Group has already been described in Chapter VII, page 217, and localities suggested for operations on it, should any be anticipated.

The Mauch Chunk Shales.—The red shales of the Mauch Chunk Series, the latter formation being described in Chapter VIII, pages 242-5, should furnish an inexhaustible supply of material adapted to the manufacture of brick. As shown on Map II, their outcrop is confined to McDowell County on the waters of Tug Fork, above Thorpe; Long Branch, at Spice Fork; Big Creek, above Duskins Branch; Jacob Fork, above Cucumber; and Dry Fork, above Canebrake. Gawthrop collected two samples of these shales for analyses and measured the two following sections at their exposures near Hartwell and Pageton, McDowell County, respectively:

Hartwell Exposure.

At south portal of Norfolk and Western Railway Tunnel.

	Feet.
1. Concealed	
2. Sandstone, shaly, ferriferous.....	3
3. Shale, gray.....	4
4. Shaly fire clay.....	2
5. Shale, gray, silicious.....	2
6. Shale, reddish brown.....	2
7. Shale, red.....	4
8. Shale, brownish gray, somewhat silicious.....	4
9. Sandstone, shaly.....	3
10. Shale, dark, flaggy.....	4
11. Shale, bluish gray.....	8
12. Shale, red, argillaceous.....	5
13. Shale, brownish gray.....	3
14. Sandstone, shaly.....	3
15. Fire clay shale.....	3
16. Sandstone, shaly.....	5
17. Shale, red, argillaceous.....	5
18. Shale, brownish gray.....	2
19. Shale, bluish gray.....	3
20. Shale, reddish brown.....	1
21. Sandstone, shaly, bluish green, to railroad grade....	21
Total.....	87

Pageton Exposure.

On north side of Tug Fork.

	Feet.
1. Concealed	
2. Shale, red.....	4
3. Sandstone, hard, bluish gray.....	1½
4. Shale, red, silicious.....	2½
5. Sandstone, shaly, greenish gray.....	6½
6. Concealed	6
7. Shale, red.....	9
8. Sandstone, shaly.....	2½
9. Shale, greenish gray.....	2
10. Shale, red, argillaceous.....	5
11. Shale, red, with streaks of sandstone.....	5
12. Concealed to railroad grade.....	9
Total.....	53

Sample No. 121G at Hartwell was collected from only Nos. 3-8, 10-13, 15 and 17-20 of the section for this point; and No. 134G at Pageton from Nos. 2, 4, 7 and 9-11 of the section for that point. The compositions of the samples, as reported by Messrs. Hite and Krak, are as follows:

	Hartwell. No. 121G. Per cent.	Pageton. No. 134G. Per cent.
Silica (SiO_2).....	61.52	62.77
Ferric Iron (Fe_2O_3).....	6.48	7.06
Alumina (Al_2O_3).....	19.58	17.51
Lime (CaO).....	0.51	0.39
Magnesia (MgO).....	0.10	0.07
Potassium Oxide (K_2O).....	2.33	2.20
Sodium Oxide (Na_2O).....	0.27	1.04
Titanium Oxide (TiO_2).....	0.41	0.97
Phosphoric Acid (P_2O_5).....	0.69	0.20
Moisture	2.03	1.88
Loss on ignition.....	5.86	5.97
Totals.....	99.78	100.06

A large sample—about a barrel full—was collected by Gawthrop at each of the above exposures, that for each being from the same members of the sections as collected for chemical analyses. As with the large sample collected from the Sandy Huff Shale near Iaeger, mentioned above, these were forwarded to Mr. A. D. Williams, at Morgantown, for actual tests in the manufacture of brick, the results of which are given on a subsequent page of the Chapter under "Road Material."

Fire Clay.

In the territory of this Report, the outcropping rocks of the Pottsville Series do not appear to carry good fire clay of either the flint or plastic variety. What occurs is generally too thin or appears too high in silica and the fusible elements for the manufacture of products requiring high refractory qualities, so that it may be disregarded as a commercial asset.

ROAD MATERIAL.

River and Creek Gravel.

In previous County Reports of the State Survey, the writer has called attention to the almost inexhaustible supply of gravel along the beds of streams, a form of road surfacing material that has only been appreciated in West Virginia within recent years. This gravel not only constitutes an abundant and convenient source of road material, but it also

possesses very durable qualities, since it not only is derived from the hardest ledges of the Pottsville Series, across which the streams flow, but it has been worn down by attrition to a size suitable for direct application to the road surface, thus saving the additional expense of crushing, and, when so placed, is self-draining. Where roads are not subjected to very heavy traffic, its use is recommended.

Limestone.

Within the territory of this Report, the deposits of limestone, as mentioned on preceding pages, consist of mere lenses and concretions, constituting a supply so meager that they may be disregarded from a road material standpoint. In the adjoining County of Mercer, however, there is an inexhaustible supply of it that could be drawn upon without great expense in transportation, especially into McDowell, where the development of the coal fields has resulted in fairly complete railway facilities.

Sandstone.

The many hard sandstone ledges of the Pottsville Series, described in Chapters V, VI and VII, furnish an inexhaustible supply of rock material that should crush into sand for use in the manufacture of concrete to be used in the various forms of highway construction. These ledges also crush into material that has given fair satisfaction on the improved roads of McDowell, where the latter are subjected to light traffic. Reference is made to the Chapters mentioned as to the ledges that appear specially adapted to both the uses suggested.

Brick.

The use of brick for surfacing improved roads is growing more and more in favor every day since the advent of the automobile, as the rapidly revolving wheels of the latter tend to destroy the surface of the best macadam road by sucking away the fine particles of binding material. On roads subjected to heavy traffic, the chief arguments in favor of brick, especially in the territory of this Report, where limestone is

lacking, are its known durability and cheapness of maintenance, the first cost being the greatest objection to overcome. In this connection, the following table should prove of interest, in which the first cost per mile is based on roads already constructed in West Virginia with a width of 14 feet, the variation in the cost depending on the distance the material had to be transported, the data being furnished by State Road Engineer Williams:

Surfacing Material.	Cost per Lineal Mile.
Gravel	\$ 500 to \$ 3,000
Macadam	600 to 7,000
Concrete	7,450 to 16,500
Brick	15,000 to 21,000

It is believed that material for the manufacture of a fair paving brick, if properly burned, can be obtained from the shales described on preceding pages of this Chapter. The large samples of Sandy Huff and Mauch Chunk Shales, forwarded to A. D. Williams, Chief Road Engineer, State Road Bureau, Morgantown, W. Va., the chemical analyses and descriptions of which are given on preceding pages of this Chapter, after grinding and moulding, were burnt at the plant of the Morgantown Brick Company of the same place, and these in turn tested in the State Road Bureau Laboratory by Richard R. Feller, under the direction of Mr. Williams. The latter gives the following report for these samples:

Tests on Brick from the Sandy Huff Shale Sample,

No. 72 (unpressed)—Survey No. 119G, from McDowell County.
 Date sample mixed, Feb. 22, 1915. None pressed, dried too quick.
 Date put in kiln, Mar. 16, 1915; position in kiln, edge of top layer.
 Time of burning, 10 days; temperature, 2400° F.
 Removed from kiln 6 days after burning; kind of brick, soft mud.
 Color and general appearance, light red and good.
 Dimensions of brick, $2\frac{3}{4}$ " x $3\frac{7}{8}$ " x $7\frac{3}{4}$ ".

Transverse Test.

Crushing Test.

Brick No.	How set.	Transverse Test.		Area of Section.	Crushing Test.	
		Breaking Load.	Modulus of Rupture.		Breaking Load Total, Lbs.	Load Lbs. per sq. in.
1	Edge	*8710	2215	$2\frac{1}{2}$ " x $7\frac{5}{8}$ "	108,470	5,289
1	Side	5530	1980	$2\frac{3}{4}$ " x $7\frac{3}{4}$ "	82,670	3,881
2	Edge	*9080	2310	$3\frac{7}{8}$ " x $7\frac{3}{4}$ "	169,000	5,628
2	Side	5450	1950	$3\frac{7}{8}$ " x $7\frac{3}{4}$ "	166,230	5,536
3	Edge	*8250	2100	$3\frac{7}{8}$ " x $5\frac{1}{2}$ "	127,830	5,998

3	Side	*5350	1910	3 $\frac{7}{8}$ "x4 "	117,750	7,597
4	Edge	*9630	2450		Average...	5,655
5	Edge	*8480	2155			
5	Side	6470	2315			
6	Edge	*8070	2050			
		Average...	2143.5			

*Brick sheared off at end.

Rattler Test.

Number of Brick.	Initial, Lbs.	Weights. Final, Lbs.	Per cent. Lost
10	29.686	12.907	56.5

Absorption Test on 5 Shale Brick as they came from kiln:

Per cent. Absorption	Dry, Lbs.	Wet, Lbs.	Gain, Lbs
3.62	14.941	15.482	0.541
Hardness, 13.8 (soft); Impact, 5 (low).			

Tests on Unpressed Brick from Mauch Chunk Shale from Hartwell, McDowell County. No. 73—Survey No. 121Ga.

Date, sample mixed, Feb. 8, 1915. Not pressed, but moulded as a soft mud brick. Date put in kiln, Mar. 16, 1915. Position in kiln, outer edge of top layer. Time of burning, 10 days. Temperature, 2400° F. Removed from kiln 6 days after burning. Color and general appearance, light red and hard. Dimensions of brick, 2 $\frac{7}{8}$ "x3 $\frac{7}{8}$ "x7 $\frac{3}{4}$ ".

Transverse Test.

Crushing Test.

Brick No.	How set.	Breaking Modulus of		Area of Section.	Breaking Load	
		Load.	Rupture.		Total, Lbs.	Lbs. per sq. in.
1	Edge	8,410		3 $\frac{7}{8}$ "x7 $\frac{3}{4}$ "	199,960	6,655
2	Edge	4,900		3 $\frac{7}{8}$ "x7 $\frac{3}{4}$ "	212,370	7,072
3	Edge	7,990		2 $\frac{3}{4}$ "x3 $\frac{3}{4}$ "	54,710	5,307
	Averages	7,100	1730	2 $\frac{7}{8}$ "x3 $\frac{7}{8}$ "	47,830	4,294
				3 $\frac{1}{2}$ "x3 $\frac{7}{8}$ "	70,900	5,229
				3 $\frac{1}{4}$ "x3 $\frac{1}{8}$ "	66,440	5,191
					Average...	5,625

Rattler Test.

Number of Brick.	Initial, Lbs.	Weights. Final, Lbs.	Per cent. Lost
10	65.98	40.40	38.8

(One brick broke in test; all the rest remained whole.)

Absorption Test on 5 whole brick as they came from kiln:

Per cent. Absorption	Dry, Lbs.	Wet, Lbs.	Gain, Lbs.
8.18	14.976	16.201	1.225
Hardness, 12.4 (soft); Impact, 7 (low).			

Tests on Pressed Brick from Mauch Chunk Shale from Hartwell, McDowell County.—No. 73—Survey Sample No. 121G.

Date sample mixed, Feb. 8, 1915. Date sample pressed, Feb. 24, 1915, at 18,000 lbs. per brick flat. Date sample put in kiln, Mar. 16, 1915. Position in kiln, outer edge at top of kiln. Time of burning, 10 days. Temperature, 2400° F. Removed from kiln, 6 days after burning. Kind of brick, pressed. Color and general appearance, light red and hard. Dimensions of brick, $2\frac{1}{8}" \times 3\frac{7}{8}" \times 7\frac{3}{4}"$.

Transverse Test.				Crushing Test.	
		Breaking Load.	Modulus of Rupture.	Area of Section.	Breaking Load
Brick No.	How set.	Load.			Total, Lbs.
1	Edge	7,040		$3\frac{7}{8}" \times 7\frac{3}{4}"$	243,710
2	Edge	7,610		$3\frac{7}{8}" \times 7\frac{3}{4}"$	216,230
2	Edge	7,600		$2\frac{5}{8}" \times 3\frac{1}{2}"$	45,600
4	Edge	7,550		$2\frac{3}{4}" \times 3\frac{3}{4}"$	86,140
	Averages	7,450	1,858	$2\frac{3}{4}" \times 3\frac{3}{4}"$	61,320
				$2\frac{1}{16}" \times 3\frac{1}{2}"$	39,160
					Average... 6,511

Rattler Test.			
Weights.			
Number of Brick.	Initial, Lbs.	Final, Lbs.	Per cent. Lost
10	62.52	41.88	33.0
Absorption Test on 5 whole brick as they came from kiln:			
Per cent.	Absorption	Dry, Lbs.	Wet, Lbs.
8.27		14.334	15.520
			1.186
Hardness, 12.5 (soft); Impact, 7 (low).			

Tests on Unpressed Brick from Mauch Chunk Shale from Pageton, McDowell County.—No. 74—Survey Sample No. 134G.

Date sample mixed, Feb. 2, 1915. Sample not pressed, moulded as soft mud brick. Date sample put in kiln, Mar. 16, 1915. Position in kiln, outer edge of top layer. Time of burning, 10 days. Temperature, 2400° F. Removed from kiln, 6 days after burning. Kind of brick, soft mud. Color and general appearance, light red and hard. Dimensions of brick, $2\frac{3}{4}" \times 3\frac{7}{8}" \times 7\frac{3}{4}"$.

Transverse Test.				Crushing Test.	
		Breaking Load.	Modulus of Rupture.	Area of Section.	Breaking Load
Brick No.	How set.	Load.			Total, Lbs.
1	Edge	5,640	1,434	$4" \times 2\frac{7}{8}"$	69,850
2	Edge	4,870	1,238	$2\frac{3}{4}" \times 3\frac{3}{4}"$	57,140
3	Edge	2,830	721	$3\frac{7}{8}" \times 7\frac{3}{4}"$	163,100
	Average...		1,130	$3\frac{7}{8}" \times 7\frac{3}{4}"$	150,950
				$3\frac{7}{8}" \times 7\frac{3}{4}"$	163,240
					Average... 5,537

Number of Brick.	Rattler Test.		
	Weights.		
	Initial, Lbs.	Final, Lbs.	Per cent. Lost
10	66.68	31.20	53.2

Only 2 brick did not break, but wore off. There were 25 pieces in all coming from the rattler.

Absorption Test on 5 whole brick as they came from kiln:

Per cent. Absorption	Dry, Lbs.	Wet, Lbs.	Gain, Lbs.
6.45	15.120	16.096	0.976
Hardness, 12.2 (soft); Impact, 5 (low).			

Tests on Pressed Brick from Mauch Chunk Shale from Page-ton, McDowell County.—No. 74—Survey Sample No. 134G.

Date sample mixed, Feb. 2, 1915. Date sample pressed, Feb. 11 and 12, 1915, at 18,000 lbs. per brick flat. Date sample put in kiln, Mar. 16, 1915. Position in kiln, outer edge of top ring. Time of burning, 10 days. Temperature, 2400° F. Removed from kiln, 6 days after burning. Kind of brick, pressed. Color and general appearance, light red and hard. Dimensions of brick, $2\frac{3}{4}$ "x $3\frac{3}{4}$ "x $7\frac{5}{8}$ ".

Transverse Test.				Crushing Test.		
Brick No.	How set.	Breaking Load.	Modulus of Rupture.	Area of Section.	Breaking Load	
					Total, Lbs.	Lbs. per sq. in.
1	Edge	4,360	1,183	3¾"x7⅝"	151,910	5,313
2	Edge	5,600	1,519	3¾"x7⅝"	192,450	6,731
	Average.	4,980	1,351	2⅛"x3¾"	77,960	7,734
				2⅛"x3¾"	56,900	5,644
				2⅛"x3"	45,280	5,618
				2⅛"x3"	56,000	6,948
				Average...	6,324	

Number of Brick.	Rattler Test.		
	Weights.		
	Initial, Lbs.	Final, Lbs.	Per cent. Lost
10	61.04	33.04	45.8

Only 3 brick did not break, but wore off. There were 17 pieces altogether coming from the rattler.

Absorption Test made on 5 whole brick as they came from the kiln:

Per cent. Absorption	Dry, Lbs.	Wet, Lbs.	Gain, Lbs.
6.34	13.894	14.770	0.876
Hardness, 14.9 (soft); Impact, 6 (low).			

A portion of each of the three large samples of shale was forwarded by Mr. Williams to the U. S. Bureau of Standards. Department of Commerce, Washington, D. C., for special heat tests, the results of which are shown in the following letter:

"DEPARTMENT OF COMMERCE
Bureau of Standards

Washington,

March 17, 1915.

"Mr. A. D. Williams, Chief Road Engineer,
State Road Bureau, Morgantown, W. Va.

"Dear Sir:

"We beg leave to report upon three samples of shale, submitted by you for examination and marked, respectively, No. 119G, 121G and 134G. The plasticity and working quality of the three materials appear to be very satisfactory, and would seem to be suited for the stiff mud process. Sample No. 134 was more plastic than Nos. 119 and 121.

"The amount of water of plasticity required by these three materials were:

	Sample No.		
	119G ¹	121G ²	134G ³
Per cent. water of plasticity.....	17.7	17.0	21.2

"The linear drying shrinkage was for sample No. 119, 2.44 per cent; No. 121, 2.61 per cent; No. 134, 5.15 per cent.

"Upon burning the specimens in a large gas-fired kiln and withdrawing some of them at a number of temperatures, the porosity shown by these materials are compiled in the following table. The porosity of each specimen was determined by immersion and boiling in vacuo,

and calculating this value from the relation $\frac{W - D}{W - S} \times 100$, where W is the wet weight; D, the dry weight, and S the suspended weight.

	No. 119G.	No. 121G.	No. 134G.
Temp. °C.	Per cent.	Per cent.	Per cent.
900	30.45	28.41	27.50
950	26.94	26.70	24.50
1000	20.17	22.30	18.25
1025	19.53	20.67	15.80
1050	16.46	18.57	12.87
1075	13.73	16.25	10.73
1100	11.55	13.70	8.74
1125	9.53	11.40	6.65
1150	9.13	8.95	5.81
1175	8.58	6.96	4.58
1200	8.28	5.58	3.89

"From these data it appears that the burning behavior of all three materials is very satisfactory, there being no tendency to show abrupt vitrification.

"No. 119 seems to be slightly more refractory than Nos. 121 and 134. From the above evidence, it would seem that all three of the materials are very promising for the manufacture of paving brick, and it would be desirable to test them out on a manufacturing scale by burning a number of bricks made from these clays in a paving brick kiln. As far as the present tests go, there is no objection to their use as paving materials. The color of the burned clay was typical of the ferruginous shales in paving brick manufacture.

"Yours very truly,

(Signed)

"P. H. Baty, For the Director."

¹Sandy Huff Shale, near Jaeger, McDowell County, West Virginia.

²Mauch Chunk Shale, at Hartwell McDowell County, West Virginia.

³Mauch Chunk Shale, at Pageton, McDowell County, West Virginia.

A careful study of all the foregoing tests of brick from shale samples Nos. 119G, 121G and 134G, show a high-grade material for building purposes, having an attractive appearance and possessing a remarkably high crushing strength. The great loss in the rattler tests of the brick from each shale—No. 121G giving best results—would prevent their use for paving purposes. A glance at the heat tests in the letter quoted above shows a marked lowering in the porosity of the product, as the temperature of the kiln was increased. This leads to the conclusion that the fault may be in the burning of the brick and not in the raw shale, the chemical analyses of which show them possessing about the right combination of silica, alumina and the fusible elements for the manufacture of good paving brick. Had they been burned, say at a temperature of about 2800 to 3000° Fahr., the rattler tests would probably have shown a much lower percentage of loss.

BUILDING STONE.

In Chapters V, VI, VII and VIII, nearly all the sandstone quarries have been described under their respective geological horizons. The following table gives a list of these, arranged in descending order and classified by Series, along with page references to their descriptions:

Name of Sandstone	Location of Quarry.	Page of this Report.
In New River Group:		
Quinnimont	Maben, 2.5 mi. N. E.....	207
	Deegans, east portal R. R. tunnel.....	207
	Welch, S. side of Elkhorn Creek.....	207
	Yukon, $\frac{1}{4}$ mi. S., west bank of Dry Fork.....	208
Pineville	O'msted, N side of Elkhorn Creek.....	211
	Welch, S. side of Elkhorn Creek.....	212
	Welch, just N.W. of, N. side of Tug Fork.....	212
In Pocahontas Group:		
Flattop Mountain.....	(Descriptions given below).	
Pierpont	Pageaton, 1.3 mi. North.....	219
Eckman	Eckman, S. side of Elkhorn Creek.....	221
	Elkhorn, S. side of Elkhorn Creek.....	222
	Pageaton, $\frac{1}{4}$ mi. N. W., N. side of Tug Fork	222
Upper Pocahontas.....	Elkhorn, opposite railway station.....	225
	Maybeury, 0.5 mi. S. E.....	225
Lower Pocahontas.....	Gary, just E. of mouth of Adkin Branch.....	228
	Berwind Sta., 1.3 mi. S. E.....	229
	Canebrake, 0.3 mi. N.....	229-30
Vivian.....	East Vivian, E. edge.....	232
	North Fork, just N. E.....	233
	Elkhorn, 0.1 mi. West.....	233
	Gary, 0.8 mi. S. E.....	233
Keystone.....	Mullens, N. edge of.....	234
	North Fork Sta., 250 yards west.....	237
	Powhatan, 0.4 mi. S. W.....	237-8
	Thorpe, $\frac{1}{4}$ mi. N. E.....	238
In Mauch Chunk Series:		
Pageaton.....	Pageaton, N. side of Tug Fork.....	243-4
Hartwell.....	Hartwell, 0.6 mi. S. E.....	244
Ballard Harmon.....	Near mouth of Ballard Harmon Branch.....	245
Anawalt.....	Anawalt, S. W. edge, opposite Little Creek	245

Available Stone.

As shown by the descriptions given of the members of the rock column in Chapters V, VI, VII and VIII, there is an inexhaustible supply of sandstone that should be adapted to crushing into sand for the manufacture of concrete for use in buildings, as also of rock suitable for rough stone work, such as coke-ovens, bridge piers, foundations, retaining walls and mining buildings, but as a general rule, these ledges are too much current-bedded and irregular in texture for ornamental forms. Hence, their use for building purposes will

be strictly local, and any attempt to develop commercial quarries on a large scale to compete with outside markets is likely to end in failure. The several quarries have already been described on the pages noted in the foregoing table, except those on the Flattop Mountain Sandstone, the details of which are given below.

The Flattop Mountain Sandstone.

The Flattop Mountain Sandstone, described in Chapter VII, pages 216-17, has been quarried to a considerable extent in McDowell County along Elkhorn Creek and Dry Fork, the two following operations being on the former stream and the first examined by Gawthrop on Laurel Branch of Elkhorn, 1 mile north of Kimball, at an elevation of 1575' B.:

	Feet.
Concealed.....	
Coal, No. 8 Pocahontas, visible.....	1
Fire clay shale.....	2
Sandstone, shaly, broken.....	10
Shale, silicious.....	5
Sandstone, shaly..... 8' }	
Sandstone, massive and broken, gray, hard, micaceous, quarry ledge.... 15 }	Flattop Mountain.... 23

The stone splits irregularly and is hard to mason. The output was used in the construction of a retaining wall at the shaft of the Houston Coal & Coke Co. in the immediate vicinity.

The following section was measured by the writer at a quarry in this ledge on the south side of Elkhorn Creek, 0.6 mile west of Olmsted, at an elevation of 1385' B., 290 feet above the No. 3 Pocahontas Coal:

	Ft.	In.
Concealed and sandstone.....		
Coal 0' 3" }		
Sandstone, 0" to..... 0 10 }	No. 8 Pocahontas	1 7
Coal 0 6 }		
Fire clay shale.....	4	0
Shale, sandy and buff.....	10	0
Sandstone, quarry ledge, bluish gray, fine grained, micaceous, to base of quarry, Flattop Mountain	21	0
Sandstone, bluish gray, to road, Flattop Mountain	7	0
Concealed		

Stone from the above quarry was used in macadamizing the improved road along Elkhorn here, the surface of which stands up fairly well under light traffic.

The following section was measured by Gawthrop at a quarry in the Flattop Mountain Sandstone on the east bank of Tug Fork, 1.4 miles southward from Welch, near the mouth of Slickrock Branch, at an elevation of 1330' B.:

	Feet.
Sandstone, massive, broken.....	10
Sandstone, flaggy.....	5
Shale	5
Coal, No. 8 Pocahontas, 10" to.....	1
Fire clay shale.....	5
Sandstone, quarry ledge, massive, gray and hard, mica- ceous, Flattop Mountain	20
Concealed to run.....	15

Stone from the above quarry was used in surfacing the improved road along Tug Fork in the immediate vicinity.

The following section was measured by the writer at the **Geo. Barley quarry**, on the east side of Tug Fork, 0.5 mile south of Welch, at an elevation of 1340' B., in what is either the Flattop Mountain Sandstone, or another immediately overlying it:

	Ft.	In.
Sandstone, broken.....	5	0
Sandstone, massive.....	5	0
Sandstone, shaly.....	3	0
Coal, (No. 9 Pocahontas?)... ..	0	8
Shale	1	0
Sandstone, quarry ledge, massive, medium grained, micaceous, bluish gray to grayish brown, to base of quarry.....	45	0
Concealed		

Stone from this quarry is used in the construction of foundations and retaining walls in Welch. It splits fairly well, according to Mr. Barley.

Along Dry Fork, the following section was measured by the writer at a quarry in the Flattop Mountain Sandstone at the "break-through" of this stream into Big Creek, where it comes about 250 feet above the No. 3 Pocahontas Coal:

	Feet.
1. Sandstone, grayish white.....	20
2. Coal, No. 8 Pocahontas	1
3. Sandstone, quarry rock, makes great cliff, current bedded, medium grained, micaceous, very hard, bluish gray, Flattop Mountain	60
4. Shale, Rift , dark, sandy, with lenses of iron ore, bed of creek.....	5

On the north bank of Dry Fork at this point, the Flat-top Mountain ledge has been quarried to some extent, furnishing the stone from which the Sandy River District High School building was constructed, where it presents an attractive appearance. The basal half of this stratum has a much more massive aspect than the upper, and should split into blocks of almost any desired size. On the west side of the "break-through," the ledge should furnish a large amount of stone with little expense for cover and soil removal. One hundred feet westward, an overlying sandstone—No. 1 of the above section—very similar in physical appearance to the one under discussion, crops in a prominent cliff, thus making an additional amount of stone readily available.

About 25 feet of the top portion of the Flattop Mountain Sandstone was once quarried on the west side of Dry Fork near the west edge of Berwind, at an elevation of 1575' B. Here it is current-bedded, platy, medium-grained and bluish gray in color. Mr. C. A. Bailey, of Berwind, Engineer for the New River and Pocahontas Consolidated Coal Company, sent a sample of stone from this quarry to the State Highway Inspector to ascertain its character as a road surfacing material, who in turn forwarded it to the Office of Public Roads, U. S. Department of Agriculture, Washington, D. C., the following report being received:

"Specific gravity.....	2.6
Weight per cubic foot.....	162.0
Water absorbed per cubic foot.....	2.16 lbs.
Per cent of wear.....	4.2
French coefficient of wear.....	9.4
Hardness	16.8
Toughness	9.0
Cementing value.....	Very good

"Remarks:

"A rock of medium hardness and resistance to wear and low toughness and very good cementing values. Best suited for light traffic roads."

"L. W. PAGE, Director,
Office of Public Roads,
U. S. Dept. of Agriculture."

WATER POWER.

Available Streams.

As in the adjoining area of Logan and Mingo Counties, no attempt has ever been made in the territory of this Report to utilize the streams for the development of water power on a commercial basis. The most important streams in this respect are Clear Fork and Guyandot River in Wyoming and Tug and Dry Forks in McDowell. Large hydro-electric power plants might be constructed along any of these four streams, but all the conditions are not favorable. No gaging records are available but in the winter and spring the run-off should be large, while in the summer and fall it should be correspondingly small, thus making it necessary to impound a vast quantity of water in storage reservoirs to equalize the flow at the power plants. Another drawback is the presence of large coal fields, mining operations and towns low down along the valleys of the streams in question. If the necessary large storage reservoirs be constructed, the damage done to plants now in active operation and to the flooding of the outcrops of coal beds that are low down near the valley floors and which constitute a reserve supply of fuel, would be so great that the cost of condemnation would be prohibitive. A further objection is the lack of convenient markets, without which the projects would be doomed to failure.

The following table, showing the indicated horse-power developed by the streams mentioned above within the area under discussion, is compiled from tables 19 and 20, pages 428 and 430, of the Semi-Centennial History of West Virginia, by Dr. J. M. Callahan, the tables in question being a part of a special article on "Water Power Resources," by A. H. Horton, District Engineer, Water Resources Branch, U. S. Geological Survey:

Indicated Horse-power of Streams Passing Through Wyoming and McDowell.

Name of Stream.	Section of Stream.		Length, miles.	Mean drainage area in square miles.	Minimum discharge, Sec.-Feet.	Assumed discharge for maximum development, Sec.-Ft.	Total fall, feet.	Minimum horse-power.	Assumed maximum development, horse-power.
	From	To							
Clear Fork.....	Source	Guyandot River	14	a126	11	45	1450	366	1500
Guyandot River.	Source	above Clear Fork	41	a371	32	134	960	705	8960
Tug Fork.....	Source	above Dry Fork.....	32	a270	23	97	2100	1112	4680
Dry Fork.....	Source	Mouth	27	a180	16	65	2100	772	3140
Totals.....	.....	.....	.....	.....	.....	.....	.....	2955	12280

a=total area.

FORESTS.

Wyoming County.

A very complete description of the forests of West Virginia by Counties is given by A. B. Brooks, in Chapter VI, Volume V, of the State Geological Survey Reports, published in 1911, the details of which pertinent to Wyoming County, as given on pages 318-321, are republished as follows:

"Former Timber Conditions.

"Poplar, oak, hemlock and chestnut once grew in great abundance in Wyoming County. Besides these there were smaller quantities of ash, basswood, black walnut, cucumber, maple, hickory, beech, birch, locust, buckeye, black gum, sycamore, wild cherry, pitch pine, and others of less value. The excellent quality of poplar, hem'ock, cucumber, basswood and walnut should be mentioned. The quantity of black walnut was not large, but on Clear Fork and Big Huff Creek, it grew in considerable abundance and was often figured. The oaks, white oak, red oak, black oak, chestnut oak and scarlet oak, were abundant, particularly white oak, but were more or less inferior in quality.

"The Lumber Industry.

"Except for a little rafting on the lower waters of the Guyandot no timber was taken out before 1890. All that was manufactured on whip saws and saw mills prior to that date was used for domestic purposes. All the logs and lumber so far taken out have been floated down the Guyandot River, hauled on wagons to the Norfolk and Western Railroad in McDowell County, or shipped over the Virginian Railroad which has recently tapped the extensive forests in the eastern end of the county.

"Floating on the Guyandot.

"Extensive floating began about 18 years ago and is still carried on. The Little Kanawha Lumber Company floated poplar, ash, cucumber and basswood logs and manufactured them into lumber on their mill at Portsmouth, Ohio. This company operated for about 7 years. The Yellow Poplar Lumber Company also floated timber of the same kinds and manufactured it at Coal Grove, Ohio. H. Gordon floated poplar, ash, cucumber, basswood and black walnut logs to Huntington, West Virginia, and manufactured them there. The Ohio Falls Car Company floated poplar timber to their works at Jeffersonville, Indiana. M. Goble floated poplar, also, and sold it on the market. All these companies and individuals named above began floating about the year 1892 and ceased operations from 1896 to 1899. C. Crane and Company, Cincinnati, Ohio, commenced floating on the Guyandot and its larger tributaries in 1896 but did not operate actively until 4 years later. Since then the company has handled the bulk of the timber which has gone out. Probably not less than 30 million cubes of poplar, oak, hemlock, ash, cucumber, chestnut, and a small quantity of black walnut and basswood have been rafted to Cincinnati from Wyoming County and sawed by this company on its 3 band mills located in that city. Other smaller operators were S. H. Nigh, who floated small black walnut logs to Catlettsburg, Kentucky, in 1900, Jefferson Gill who floated poplar and ash to be manufactured by the Freedman Lumber Company at New Richmond, Ohio, and Newman and Spanner who have floated poplar, ash and cucumber to Ironton, Ohio.

"Saw Mills.

"Large quantities of timber have been taken out by saw mill companies. R. E. Wood Lumber Company, 1898-1906, sawed at Hanover on Little Huff Creek, taking the timber from about 5,000 acres. The lumber from this mill was hauled across the mountains to the Norfolk and Western Railroad. Crosby and Beckley Lumber Company, 1898-1902, operated 2 mills, one on Indian Creek, another on Pinnacle Creek, cutting the timber from about 5,000 acres. E. H. Suddeth Lumber Company, in operation since 1902, has cut over 4,000 acres. Keys-Fannin Lumber Company, at Herndon on the Virginian Railroad, has operated a band mill since 1904. The W. M. Ritter Lumber Company, with a band mill at Mahen on the Virginian Railroad, is cutting timber from a large virgin tract lying in Wyoming and Raleigh Counties. A number of small mills, also, have been sawing for the past few years at various points. The black walnut was taken out of the county, principally, on wagons to the Norfolk and Western Railroad from 1895 to 1900. There are now in operation in the county 2 band mills and 19 circular mills. These have a combined capacity of about 45 million

feet annually. If we estimate the present stand of timber at 800 million feet, the mills that are now in the county, if kept running at the present rate, will cut every foot of it in 18 years.

"The probabilities are, however, that at least some merchantable timber will be standing in the county 18 years hence. Within 10 years the virgin areas will be cut over. Then the large mills will move on to other fields, probably outside the State, leaving the cutting of the balance to smaller operators as the lumber is needed or sold by coal companies and other owners. Doubtless some areas of good timber will be maintained by those who are now conservative cutters and by others who will be shown by the stress of circumstances the necessity for careful preservation of young, growing timber. Floating will be kept up on the Guyandot but to what extent it is difficult to say.

"The Present Forest Conditions.

"Wyoming County now contains:

44,150 acres Virgin Forest,
192,490 acres Cut-over Forest,
100,000 acres Farm Land.

"The greater part of the virgin forest lies in the eastern part of the county along the Raleigh boundary line. About a dozen isolated areas of different sizes are scattered through the interior. Practically all the virgin area is in the hands of operators and will be cut over within the space of a few years. More than half of the whole area of the county must be classed as cut-over forest land. This, in many places, still contains a fair percentage of the original stand of timber for the reason, in part, that some of the largest floaters have established a 16-inch cutting limit. The 100,000 acres of farm land lies, principally, in more or less narrow strips along the principal water courses. The largest and best farming section is along the Clear Fork of Guyandot. There are about 60,000 acres of land under cultivation and in grass."

Areas Suitable for Reforestation.

Only a very small portion of the area of Wyoming County is under cultivation, probably 75 per cent. consisting of steep mountain land that is too rough and stony to be available for agricultural purposes, and tillage being confined mostly to narrow strips along the valley floors, with now and then a small cove clearing. Hence, there are large areas already forested, and others that will be non-productive, unless they can be made to produce timber. By far the greater portion of the land is owned by large coal and lumber companies, so that the problem of reforestation is much simplified. Under a cooperative arrangement, a force of forest rangers might be employed, with assessments on the companies proportional to the number of acres owned, who could look after the protection of young timber from fires, the planting of new trees

and direct the cutting of the mature timber. This would not only secure a permanent return from what is now waste land, but also tend to conserve the water supply along the streams throughout the year. The utility of forests and the immeasurable benefits derived in the application of a systematic plan of reforestation are well stated by A. B. Brooks on pages 17-47, inclusive, of Volume V, of the State Survey Reports.

McDowell County.

On pages 184-188 of the volume last mentioned, Mr. Brooks also described the forests of McDowell County, portions of which are republished as follows:

"Former Forest Conditions.

"All sections of McDowell County once contained a large quantity of valuable timber except the very steep river bluffs and the more or less narrow strips of land lying on the sandy ridges. It may be said that yellow poplar and white oak were the predominant valuable hardwoods and that hemlock was the only softwood worthy of mention. There were many other hardwoods, however, that grew in merchantable quantities. Some of these were basswood, cucumber, white ash, black walnut, sugar maple, red oak, chestnut oak, black oak, chestnut, hickory, beech, locust and sweet buckeye. Percentages of the principal timber trees standing on a 7,000 acre tract of virgin timber now remaining in the country are given approximately as follows:

"Yellow Poplar	20 per cent.
White Oak	30 per cent.
Red Oak.....	} 10 per cent.
Chestnut Oak.....	
Black Oak.....	
Scarlet Oak.....	
Hemlock	20 per cent.
Basswood.....	} 5 per cent.
Cucumber.....	
White Ash.....	
Hickory.....	
Beech.....	} 15 per cent.
Chestnut.....	
Sugar Maple.....	
Red Maple	
Sweet Buckeye.....	
Sycamore.....	}
Birches and others.....	

"Yellow poplar, white oak, red oak and some other hardwoods grew to an enormous size in the numerous narrow valleys and rich coves of McDowell County. A yellow poplar containing 12,500 feet of good lumber was cut on Longpole Creek by Hamlet and Strother. The quality of several of the kinds of timber growing in this section of the State was unsurpassed. The sapwood was thin and the lumber clear and easily worked.

"The Early Lumber Industry.

'Comparatively little timber was destroyed in the 'clearings' of the early settlers. The greater part of the county remains in forest even to the present day, the improvements being confined mainly within narrow limits along the principal water courses.

"Before the completion of the Norfolk and Western Railroad through the county in 1892, only a little timber had been cut except in a limited way for domestic use. This was drifted down the Tug River and its lower tributaries which, at that time, furnished the only means of transportation. Very little had been taken even in this way east of the mouth of Clear Fork, 14 miles below Welch. Yellow poplar which was rafted to Catlettsburg, Kentucky, and black walnut, cut in 1886, were the principal timbers removed in this way.

"Later Lumber Operations.

"Beginning about the year 1891 W. M. Ritter, with circular saw mills located on Shannon Branch, Browns Creek and at other points, removed timber from nearly all the land lying on the north side of the railroad from Welch to Hensley. A few years later he leased the large mill belonging to Panther Lumber Company then sawing timber from lands on Panther and Bull Creeks. At the same time he bought the uncut timber belonging to the Company and an additional 50,000 acres lying on Panther Creek and Dry Fork and began to operate under the firm name of The W. M. Ritter Lumber Company. In 1899 this company erected a large band mill at the mouth of Crane Creek, a tributary of Dry Fork, and, in the following year, another on Beartown Creek, about 2 miles above. These 2 mills sawed the remaining timber from the 50,000 acre boundary known as the Lansburgh tract. The lumber from these mills was taken over the Company's private railroad which formed a junction with the Norfolk and Western Railroad at the mouth of Dry Fork. The lumber railroad has since been acquired and extended to Berwind as a branch of the Norfolk and Western. W. M. Ritter, first with portable mills and later with the large stationary mills above referred to, has been the largest operator in the county.

"C. L. Ritter Lumber Company operated a band mill at the mouth of Clear Fork of Tug River, cutting most of the timber on that creek.

"R. E. Wood Lumber Company, beginning in 1899 with a mill at Sandy Huff, cut the timber from the region up Sandy Huff Creek.

"The next large operation was that of Suddeth and Bailey Lumber Company. This company has sawed at Norwood, on Spice Creek, on Jenny Creek and at Shannon Branches.

"Louis Carr, who operated first as Carr and McClure, later as Carr and Nunan, and still later as Norwood Lumber Company, cut timber from large tracts of land on Tug River and on Laurel Creek, a northern tributary of Elkhorn.

"Dr. W. R. Jaeger, as Jaeger and Brothers, 1892, operated a mill in Roderfield at the mouth of Spice Creek. Only the choicest timber was taken by this company. That which remained was afterward saved by Suddeth and Bailey Lumber Company and R. E. Wood Lumber Company.

"The timber on 6,000 acres near Roderfield belonging to the McCormick estate was cut, principally, by R. E. Wood Lumber Company and by R. W. Higby.

"The Longpole Lumber Company, Wyoming City, began in 1901 and cut over a tract lying on Fourpole, Longpole and Shortpole Creeks.

"The Caretta Lumber Company cut the timber on Barrenshe Creek and Reedy Spring Branch.

"John R. McKinsey has been the principal manufacturer of staves. The stave industry in McDowell, however, has been of minor importance.

"In addition to the larger lumber operations named above, numerous small mills have been located at various points throughout the county. These have been prominent factors in the reduction of the original stand of timber.

"Water saw mills, which have flourished in their day in many parts of the State, seem never to have found their way into McDowell County.

"Present Forest Conditions.

"There are perhaps not over 15,000 acres of cleared land in the county. Of this the native settlers, who occupy the narrow valleys of creeks and rivers, own less than one-half. The balance is owned principally by coal companies. More than 95 per cent. of the whole area must be classed as forest land. There yet remain about 15,000 acres of virgin timber land. This lies principally in 2 bodies, one of about 3,000 acres on the northwestern side of the Dry Fork of Tug and the other of about 12,000 acres on the opposite side of Dry Fork along the southern edge of the county. The remaining 400,000 acres, or more, must be classed as cut-over forest.

"The condition of the forest land varies considerably in the different localities. In many places, especially along the railroads and in the vicinity of large coal operations, the condition of the badly burned and cut-over land is not hopeful. In other sections, however, there is a sufficient stand of young trees of the species mentioned under the head of 'Former Forest Conditions.' Careful management of such areas will insure a profitable yield within a few years. The virgin timber land and the best of the cut-over land lies south of a line beginning at Bradshaw Station on the Dry Fork of Tug and running thence eastward to the Mercer County Line by the way of Gary Station on the Tug River and the divide between the waters of Tug River and Elkhorn Creek.

"There are 87 coal companies in operation in the county with an average of 3 openings each. Practically all the timber land is owned by 3 or 4 of these companies. Large quantities of timber are required for mine props, mine ties, etc., and some of the large companies are purchasing their mine timbers from Virginia and Kentucky in order to conserve their own young growth."

Areas Suitable for Reforestation.

Practically the same conditions, as regards topography, timber conditions and ownership of the land, prevail in McDowell County as in Wyoming, so that the plan suggested above for the preservation of the timber resources of the latter County could be employed with equal facility in McDowell to the profit of all concerned.

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